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GREENWICH
PHOTO-HELIOGRAPHIC
RESULTS.

1924.

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RESULTS OF MEASURES

MADE AT THE

ROYAL OBSERVATORY, GREENWICH

UNDER THE DIRECTION OF

SIR FRANK DYSON, M.A., LL.D., F.R.S.,

ASTRONOMER ROYAL,

OF

PHOTOGRAPHS OF THE SUN

TAKEN

AT GREENWICH, AT THE CAPE, AND IN INDIA

IN THE YEAR

1924.

WITH A

DETERMINATION OF THE SUN'S ROTATION

AND A DISCUSSION OF

THE CHARACTERISTIC MOVEMENTS OF SPOTS

FROM GREENWICH MEASURES, 1878-1923.

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GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1924.

INTRODUCTION.

§ 1. *Positions and Areas of Sun Spots and Faculae for each Day in the Year 1924.*

The photographs from which these measures were made were taken at the Royal Observatories of Greenwich or of the Cape ; at the Kodaikánal Observatory, Southern India ; or at Dehra Dûn, North-West Provinces, India.

The photographs of the Sun obtained at Greenwich were taken either with the Dallmeyer Photo-heliograph, of 4 inches aperture (stopped down to 2.9 inches) or the Thompson Photo-heliograph of 9 inches aperture (usually stopped down to 4 inches). The latter instrument was remounted after its return from Russia on the 26-inch Refractor and was brought into regular use on July 16. Both Photo-heliographs give a solar image of about 10-cm. radius. The two instruments are worked in conjunction ; the Dallmeyer Photo-heliograph is of most use in snatching a photograph in breaks on cloudy days, while the Thompson Photo-heliograph is best employed in intervals of good definition.

The photographs from the Cape Observatory were taken under the superintendence of His Majesty's Astronomer at the Cape, Mr. H. Spencer Jones, and those from Kodaikánal under the superintendence of the Director, Dr. T. Royds. The photographs from Dehra Dûn, which have been forwarded by the Solar Physics Committee to fill the gaps in the combined series, were taken under the superintendence of the Deputy Surveyor-General, Trigonometrical Survey of India. At two of the observatories the instrument employed was a Dallmeyer Photo-heliograph giving an image of the Sun about 10 centimetres in radius ; at Kodaikánal a Cooke photo-visual object-glass of 6 inches aperture was used, the image of the Sun being on about the same 10-centimetre scale.

3 Oct 27 Krueger

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Photographs of the Sun were available for measurement upon each day in 1924, those finally selected for measurement being supplied by the different observatories as under :—

Greenwich	..	..	..	..	..	..	..	..	212
Cape	..	..	..	..	..	..	..	..	147
Kodaikáhal	..	..	..	..	..	..	..	..	3
Dehra Dûn	..	..	..	..	..	..	..	..	4
Total	..	..	..	..	..	..	..	..	366

The names of those persons who measured the photographs for the year 1924 are as follows :—

H. W. Newton	Andrina M. Crommelin
H. Barton	Isabel Jackson

At the principal focus of the Photo-heliographs, excepting that at Kodaikáhal, two spider-lines are fixed by which the zero of position-angles on the photographs can be determined. These lines are inclined at an angle of 45° to the celestial equator in the Greenwich and Cape Photo-heliographs, and respectively perpendicular and parallel to it in the Dehra Dûn, instrument. In the Kodaikáhal Photo-heliograph there is one wire fixed parallel to the equator.

The zero of position-angles for the Greenwich, Cape, and Kodaikáhal Photo-heliographs has been determined by the measurement of plates which have been exposed twice, with an interval of about 100 seconds between the two exposures, the instrument being firmly clamped. Two images of the Sun, overlapping each other by about a fifth part of the Sun's diameter, were therefore produced upon the plates, and the exposures having been so given that the line joining the cusps passed approximately through the centre of the plates, the inclination of the wires of the photo-heliograph to this line was measured with the position-micrometer, and a small correction for the inclination of the Sun's path was then applied.

At Greenwich and the Cape, transits of the Sun were also taken over the two wires; the times of contact of the first and second limbs of the Sun with the two wires being noted. The ratio of the time taken by the Sun to pass over the NE—SW wire to that taken to pass over the SE—NW wire gives the tangent of the angle made by the Sun's path to the latter wire, the wires being assumed to be exactly at right angles to each other. From this angle, when corrected for the Sun's motion in declination, the correction for the zero of position of the wires can be inferred.

INTRODUCTION TO GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1924. D v

The following table gives the correction for zero of position thus determined by the two independent methods for the Greenwich and Cape Photo-heliographs.

Determination of the Zero of Position-Angles.

Month 1924.	Greenwich, Dallmeyer.		Greenwich, Thompson.		Cape.	
	Photographic.	Visual.	Photographic.	Visual.	Photographic.	Visual.
January ..	—	+ 2. 46 (2)	—	—	— 0. 29 (2)	— 0. 24 (4)
February ..	+ 2. 48 (1)	+ 2. 42 (2)	—	—	— 0. 28 (2)	— 0. 24 (4)
March ..	+ 2. 33 (1)	+ 2. 42 (2)	—	—	— 0. 37 (1)	— 0. 21 (4)
April ..	+ 2. 50 (1)	+ 2. 41 (2)	—	—	— 0. 26 (2)	— 0. 20 (4)
May ..	+ 2. 37 (2)	+ 2. 36 (1)	—	—	— 0. 22 (2)	— 0. 17 (4)
June ..	+ 2. 36 (2)	+ 2. 39 (2)	—	—	— 0. 15 (2)	— 0. 18 (4)
July ..	+ 2. 44 (2)	+ 2. 39 (2)	+ 2. 15 (1)	+ 2. 16 (2)	— 0. 15 (2)	— 0. 17 (4)
August ..	+ 2. 39 (1)	+ 2. 37 (1)	+ 2. 22 (1)	+ 2. 18 (2)	— 0. 13 (2)	— 0. 20 (4)
September ..	+ 2. 43 (2)	+ 2. 50 (1)	+ 2. 08 (1)	+ 2. 21 (4)	— 0. 20 (1)	— 0. 19 (4)
October ..	+ 2. 42 (1)	+ 2. 44 (2)	+ 2. 16 (2)	+ 2. 19 (2)	— 0. 25 (2)	— 0. 21 (2)
November ..	—	+ 2. 43 (1)	+ 2. 32 (1)	—	— 0. 20 (2)	— 0. 24 (2)
December ..	+ 2. 39 (2)	+ 2. 45 (2)	—	—	{ — 0. 22 (1) — 0. 38 (1)	{ — 0. 25 (2) — 0. 35 (2)

The suffixes indicate the number of zero plates or the number of sets of transits.

New wires were inserted in the Cape Photo-heliograph on December 19.

The zero-corrections used during the year 1924 in the reduction of the photographs taken at Greenwich were as follows:—

Dallmeyer Photo-heliograph	January and February ..	+ 2.75
	March and April ..	+ 2.7
	May and June ..	+ 2.6
	July and August ..	+ 2.65
	September to December ..	+ 2.7
Thompson Photo-heliograph	July 16—October 31 ..	+ 2.3
	November ..	+ 2.4

The zero-corrections used in the reductions of the photographs taken at the Cape Observatory were as follows:—

January 1 to March 31 ..	— 0.4
April 1 to September 30 ..	— 0.3
October ..	— 0.35
November 1 to December 18 ..	— 0.4
December 19—31 ..	— 0.6

D vi INTRODUCTION TO GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1924.

The zero-corrections adopted during 1924 for the three Kodaikanal photographs were :—

February 18 and March 26, $+0^{\circ}.2$; July 28, $+0^{\circ}.3$.

The adjustment of the wires in the Dehra Dûn Photo-heliograph was usually tested by stopping the driving clock immediately after a photograph had been taken and making a second exposure some two minutes after the first, a portion of a second image of the Sun, just intersecting the first, being thus obtained upon the plate. The Zero-correction adopted was $+0^{\circ}.4$.

The measures of the photographs were made with a large position-micrometer constructed by Messrs. Troughton and Simms for the measurement of photographs of the Sun up to 12 inches in diameter. In this micrometer the photograph is held with its film-side uppermost on three pillars fixed on a circular plate, which can be turned through a small angle, about a pivot in its circumference, by means of a screw and antagonistic spring acting at the opposite extremity of the diameter. The pivot of this plate is mounted on the circumference of another circular plate, which can be turned by screw-action about a pivot in its circumference, 90° distant from that of the upper plate, this pivot being mounted on a circular plate with a position-circle which rotates about its centre. By this means small movements in two directions at right angles to each other can be readily given, and the photograph can be accurately centred with respect to the position-circle. When this has been done, a positive eyepiece, having at its focus a glass diaphragm ruled with cross-lines into squares, with sides of one-hundredth of an inch (for measurement of areas), is moved along a slide diametrically across the photograph, the diaphragm being nearly in contact with the photographic film, so that parallax is avoided. The distance of a spot or facula from the centre of the Sun is read off by means of a scale and vernier to 1-250th of an inch (corresponding to 0.001 of the Sun's radius for photographs having a solar diameter of 8 inches). The position-angle is read off on the large position-circle which rotates with the photographic plate. The photograph is illuminated by diffused light reflected from white paper placed at an angle of 45° between the photograph and the plate below.

All photographs are measured independently by two persons, and the means taken.

In the case of large or complex groups of spots, the positions of the chief components are measured individually, and also for groups so near the east or west limbs of the Sun that the effects of foreshortening are appreciable. In other cases the position of the centre of a group is estimated in the micrometer. In this respect a difference has been made in the practice during years previous to 1916, where in this section components of groups are given separately and combined into groups in the Ledgers.

INTRODUCTION TO GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1924. D vii

When required, corrections are applied to the measured distances and position-angles for differential refraction. The formula is given in the *Introduction* for 1909. It is seldom necessary, however, to apply this correction except to a few photographs taken at Greenwich in mid-winter.

The calculations of heliographic longitude and latitude are made by use of the formulæ given in "Researches on Solar Physics: Heliographical Positions and Areas of Sun Spots observed with the Kew Photo-heliograph during the years 1862 and 1863" by W. De La Rue, B. Stewart, and B. Loewy. *Phil. Trans.*, 1869. If r be the measured distance of a spot from the centre of the Sun's apparent disc, R the measured radius of the Sun on the photograph, (R) the tabular semi-diameter of the Sun in arc, and ρ , ρ' the angular distances of a spot from the centre of the apparent disc as viewed from the Sun's centre and from the Earth respectively, ρ is obtained from the equations:—

$$\rho' = \frac{r}{R}(R) ; \text{ and } \sin (\rho + \rho') = \frac{r}{R}.$$

If D and ϕ are the heliographic latitudes of the Earth and the spot respectively, referred to the Sun's equator, and l the heliographic longitude of the spot from the solar meridian passing through the centre of the disc, longitudes west of the centre being reckoned as positive, and α the position-angle from the Sun's axis,

$$\begin{aligned} \sin \phi &= \cos \rho \sin D + \sin \rho \cos D \cos \alpha \\ \sin l &= - \sin \alpha \sin \rho \sec \phi. \end{aligned}$$

The position-angle α is found from the position-angle from the North Point by subtracting P , the position-angle of the N end of the Sun's axis, measured eastward from the North Point of the disc. The heliographic longitude of the spot is $l+L$, where L is the heliographic longitude of the centre of the disc. The three quantities P , D , and L for the time of the exposure of each photograph are derived from the Ephemeris for Physical Observations of the Sun given on p. 557 of the *Nautical Almanac* for 1924.

The inclination of the Sun's axis to the ecliptic is assumed to be $82^\circ 45'$, the longitude of the ascending node for 1924.0 to be $74^\circ 42' \cdot 0$, and the period of the Sun's sidereal rotation to be 25.38 days; the meridian which passed through the ascending node 1854 January 1, Greenwich Mean Noon, being taken as the zero meridian.

§ 2. General Catalogue of Groups of Sun Spots for 1924.

The Catalogue contains every group of spots which lasted for two or more days, and the group numbers are in continuation of those given in 1923 and previous years. Groups seen only once are not included, but appear in the Daily Results with a distinctive numeration.

D viii INTRODUCTION TO GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1924.

During the year 1924, a number of groups of spots have been noted in the Catalogue as "Revivals." These have been tabulated in series in a table following the Catalogue. The respective groups of each series are in the same heliographic position, and are seen in consecutive rotations but with definite breaks in their history between each rotation. The latter feature excludes them from being classed as "Recurrent" groups; they differ from "Intermittent" groups in their being of long period intermittency. When a "Recurrent" series forms part of a "Revival" series, a reference is made in the last column of the table. Other groups which are given in detail in Ledger II are also indicated.

§ 3. *Ledgers of the Areas and Heliographic Positions of Groups of Sun Spots for 1924.*

Ledger I.—Recurrent Groups.—This Ledger supersedes the Catalogue of Recurrent Groups of Sun Spots given in years previous to 1916 of the *Greenwich Photo-Heliographic Results*, and the reference numbers of the series are in continuation of those given therein. The groups forming this Ledger have been abstracted from a general Ledger of all spot groups seen throughout the year, and were selected upon the following plan, reference being made to the General Catalogue:—If any spot group when first seen was 60° or more to the east of the Central Meridian, then the Catalogue, and, if necessary, the Daily Results also, were searched some fifteen or sixteen days earlier, to ascertain whether a spot group of similar heliographic longitude and latitude was then near the west limb of the Sun. Similarly, if any spot group when last seen was 60° or more to the west of the Central Meridian, then the Catalogue was searched some fifteen or sixteen days later, to ascertain whether a spot group of similar heliographic longitude and latitude was then near the east limb of the Sun. Both the search forward and the search backward have been made in the case of every spot group that was observed close to both the east and west limbs, in order that no possible case of identity might be overlooked. When there appeared to be a case of probable identity between spot groups observed in two consecutive rotations of the Sun, the character of the second group has been carefully compared with that of the first in each of the three elements—area, longitude, and latitude, before accepting it as a Recurrent Group.

Besides the Ledgers of the groups, there have been printed in a similar manner important components of the principal groups. This has been done in all cases where it appeared probable that an individual component lasted to the second or third rotation after its first appearance.

Both in Ledger I and Ledger II, are given the proper motions of spots in longitude, instead of longitudes according to "System II" based on the formula $\xi = 14^{\circ} \cdot 44 - 2^{\circ} \cdot 13 \sin^2 \phi$ as published in these *Results* for the years 1911 to 1923 inclusive. The determination of the Sun's rotation period from long-lived spots, compiled from the *Greenwich Photo-heliographic Results* for the four cycles 1878-1923 is given in § 5 of these *Results*. The deduced daily sidereal-motion is found to be represented by the formula $\xi = 14^{\circ} \cdot 37 - 2^{\circ} \cdot 60 \sin^2 \phi$, which has been adopted in deriving the proper motions in longitude as described on pages D 38 and D 46.

Ledger II.—Non-Recurrent Groups.—This Ledger contains the most important of those groups which do not last to a second rotation. Individual components are also given after their respective groups, where they are large and distinctive.

§ 4. *Total Areas of Sun Spots and Faculæ for each day, and Mean Areas and Mean Heliographic Latitude of Sun Spots and Faculæ for each Rotation of the Sun, and for the year 1924.*

Particulars relating to this section are given in the headings on pages D 56, 60, and 61.

§ 5. *Determination of the Solar Rotation from Long-lived Spots.*

§ 6. *Characteristic Movements of Sun Spots.*

These two discussions on pages D 65-85 are based on the Greenwich Sunspot measures for the four cycles, 1878-1923.

F. W. DYSON.

*Royal Observatory, Greenwich,
1925, October 7.*

ROYAL OBSERVATORY, GREENWICH.

POSITIONS AND AREAS

OF

SUN SPOTS AND FACULÆ.

FOR EACH DAY IN THE YEAR

1924.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

- Col. 1. (1) Time when photograph was taken expressed in days and decimals of a day reckoning from midnight at commencement of year. (2) Place of observatory—Greenwich (G), Cape of Good Hope (C), Kodaikānal (K), Dehra Dūn (D). (3) Date of photograph (Civil reckoning).
- Col. 2. Number of Spot Group in order of appearance and in continuation of the Group-numbers given in previous years. Groups seen on one day only are distinguished by the number of the Rotation during which they were observed and by a letter given in the order of their appearance. When there is no number in the second column, it is to be understood that there is a Facula unaccompanied by a Spot.
- Col. 3. Distance of Spot Group or Faculæ from Sun's centre in terms of the Sun's radius.
- Col. 4. Position Angle of Spot Group or Faculæ measured from the North pole of the Sun's axis in the direction N., E., S., W., N.
- Col. 5. Heliographic Longitude of the Spot Group derived from the measures.
- Col. 6. Heliographic Latitude of the Spot Group similarly derived.
- Col. 7. Area of Umbræ corrected for foreshortening in millionths of the Sun's visible hemisphere.
- Col. 8. Area of Whole Spots composing the Group similarly expressed.
- Col. 9. Area of each group of Faculæ similarly expressed. The positions of Faculæ relative to the Spots with which they are associated are indicated by the letters *n, s, p, f, c*, denoting respectively north, south, preceding, following, concentric.
- In line with the date of each day is given in brackets the position angle of the Sun's axis from the north point: the heliographic longitude and latitude of the centre of the disc; the total areas of Spots and Faculæ for the day.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbre.	Whole Spots.	Faculæ.			Dist.	Pos. Angle.	Long.	Lat.	Umbre.	Whole Spots.	Faculæ.
1924. 0.352			°	°	°				1924. 8.309			°	°	°			
		.954	263.0					52			.939	51.7					144
		.953	356.6					46				(-1.5)	(163.8)	(-3.9)	(0)	(0)	(144)
C		.914	301.7					122	Jan. 9								
		.904	243.0					189									
		.779	233.8					75									
		.935	50.8					58									
Jan. 1			(+2.4)	(268.6)	(-3.1)	(0)	(0)	(542)	9.459		.855	321.4					81
									C		.860	44.8					108
									Jan. 10			(-2.0)	(148.6)	(-4.1)	(0)	(0)	(189)
1.167		.969	300.0					54									
D		.954	242.8					271									
		.905	47.6					290	10.355		.916	315.5					129
Jan. 2			(+2.0)	(257.9)	(-3.2)	(0)	(0)	(615)	C		.785	40.0					72
									Jan. 11			(-2.4)	(136.9)	(-4.2)	(0)	(0)	(201)
Jan. 3		No spots or faculæ.															
									11.338		.961	316.0					74
3.518		.967	306.1					41	C		.972	56.1					40
C		.935	48.7					81	Jan. 12			(-2.9)	(123.9)	(-4.3)	(0)	(0)	(114)
		.952	59.8					52									
Jan. 4			(+0.9)	(226.9)	(-3.4)	(0)	(0)	(174)									
									12.359		.912	52.2					34
4.425		.968	231.6					63	C		.984	58.9					82
C		.947	206.4					32	Jan. 13			(-3.4)	(110.5)	(-4.4)	(0)	(0)	(116)
		.728	314.0														
Jan. 5	9521		(+0.4)	(214.9)	(-3.5)	(0)	(3)	(95)									
									13.361		.958	55.9					100
5.357		.817	310.4					815	C			(-3.9)	(97.3)	(-4.5)	(0)	(0)	(100)
C			(0.0)	(202.7)	(-3.6)	(2)	(5)	(81)	Jan. 14								
Jan. 6																	
									14.332		.896	52.6					184
6.319		.903	302.3					91	C			(-4.3)	(84.5)	(-4.6)	(0)	(0)	(184)
C			(-0.5)	(190.0)	(-3.7)	(0)	(0)	(91)	Jan. 15								
Jan. 7																	
									15.449		.839	48.1					179
7.487		.972	53.1					199	G		.969	58.8					149
C			(-1.1)	(174.6)	(-3.9)	(0)	(0)	(199)	Jan. 16			(-4.9)	(69.8)	(-4.7)	(0)	(0)	(328)
Jan. 8																	

Group 9521. Jan. 5-6. One very small spot.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbræ.	Whole Spots.	Faculæ.			Dist.	Pos. Angle.	Long.	Lat.	Umbræ.	Whole Spots.	Faculæ.
1924. 16·319		·789	321·5	°	°			60	1924. 24·340		·922	309·1	°	°			88
C		·734	37·7					100	C		·818	51·3					77
		·910	55·3					119			·903	55·1					103
Jan. 17		·920	178·8					53	Jan. 25			(-8·9)	(312·7)	(-5·5)	(0)	(0)	(268)
			(-5·3)	(58·3)	(-4·8)	(0)	(0)	(332)									
17·398		·889	314·2					91	25·324		·952	307·0					111
C		·817	48·0					40	C	941b	·791	52·0		+25·0	1	16	104n
Jan. 18		·952	114·5					101	Jan. 26		·703	45·1					52
			(-5·8)	(44·1)	(-4·9)	(0)	(0)	(232)				(-9·4)	(299·8)	(-5·6)	(1)	(16)	(267)
18·535		·918	236·2					46	Jan. 27		No	spots or	faculæ.				
C		·855	296·1					116									
Jan. 19		·937	127·7					89									
			(-6·3)	(29·1)	(-5·0)	(0)	(0)	(251)									
27·443									27·443		·871	241·3					188
Jan. 20		No	spots or	faculæ.					C	941c	·968	56·1		+30·7	4	16	91n
									Jan. 28			(-10·3)	(271·9)	(-5·7)	(4)	(16)	(279)
20·391		·954	180·8					46									
Jan. 21			(-7·2)	(4·7)	(-5·2)	(0)	(0)	(46)	28·466		·925	244·1					131
									C		·922	53·1					82
									Jan. 29			(-10·7)	(258·4)	(-5·8)	(0)	(0)	(213)
21·343		·957	183·2					36									
Jan. 22			(-7·6)	(352·2)	(-5·2)	(0)	(0)	(36)	29·328		·961	244·2					85
									C		·840	45·9					87
									Jan. 30			(-11·1)	(247·0)	(-5·9)	(0)	(0)	(172)
22·403		·869	307·3					90									
C	941a	·772	317·8					74									
		·279	273·0					82									
Jan. 23		·909	130·0					124	30·407		·756	38·5					60
		·973	62·3					124	C								
			(-8·1)	(338·2)	(-5·3)	(2)	(12)	(370)	Jan. 31			(-11·5)	(232·8)	(-6·0)	(0)	(0)	(60)
23·320		·882	308·3					210									
C		·857	135·9					96									
Jan. 24		·934	58·7					189	31·457		·756	311·6					106
			(-8·5)	(326·1)	(-5·4)	(0)	(0)	(495)	Feb. 1			(-12·0)	(219·0)	(-6·0)	(0)	(0)	(106)

POSITIONS AND AREAS OF SUN SPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbræ.	Whole Spots.	Faculæ.			Dist.	Pos. Angle.	Long.	Lat.	Umbræ.	Whole Spots.	Faculæ.
1924. 32:494 G		·863	305·2	°	°			141	1924.			°	°	°			
Feb. 2			(-12·4)	(205·3)	(-6·1)	(0)	(0)	(141)	43:374 C		·761 ·917	46·3 49·6					45 42 (87)
									Feb. 13			(-16·6)	(62·1)	(-6·7)	(0)	(0)	
33:485 G		·937	302·7					166	Feb. 14		No spots or faculæ.						
Feb. 3	941d	·823	243·4	246·6	-25·3	2	17	700									
			(-12·8)	(192·3)	(-6·2)	(2)	(17)	(236)									
34:442 C		·916	245·0					71	45:407 G	9522	·502	347·0	42·3	+22·4	2	6	
Feb. 4			(-13·2)	(179·7)	(-6·3)	(0)	(0)	(71)	Feb. 15			(-17·3)	(35·3)	(-6·8)	(2)	(6)	(0)
35:346 C		·974	245·1					80	46:333 C	9522 941f	·578 ·912	328·0 113·6	42·4 316·8	+22·7 -24·3	1 1	2 24	920
Feb. 5			(-13·5)	(167·8)	(-6·3)	(0)	(0)	(80)	Feb. 16			(-17·6)	(23·1)	(-6·9)	(2)	(26)	(92)
Feb. 6		No spots or faculæ.							Feb. 17 Feb. 18 Feb. 19		No spots or faculæ.						
37:327 C		·888	303·4					31									
Feb. 7		·942	115·7	(141·7)	(-6·4)	(0)	(0)	34 (65)	50:371 C		·879	305·3					78
			(-14·3)						Feb. 20			(-18·9)	(330·0)	(-7·0)	(0)	(0)	(78)
38:339 C		·908	110·3					57									
Feb. 8			(-14·7)	(128·4)	(-6·5)	(0)	(0)	(57)	51:356 C		·932	299·9					58
Feb. 9 Feb. 10 Feb. 11	}	No spots or faculæ.							Feb. 21			(-19·2)	(317·0)	(-7·1)	(0)	(0)	(58)
									Feb. 22		No spots or faculæ.						
42:364 C	941e	·861	54·8	24·3	+25·6	0	7	48f	53:504 G		·959	78·0					56
Feb. 12			(-16·2)	(75·4)	(-6·7)	(0)	(7)	(48)	Feb. 23			(-19·8)	(288·7)	(-7·1)	(0)	(0)	(56)

Group 9522. Feb. 15-16. A single small spot.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.
1924 54.431 C Feb. 24		.813 .893	° 47.3 76.5 (-20.1)	° (276.5)	° (-7.1)	(0)	(0)	45 63 (108)	1924. 62.459 G Mar. 3	9523	.933	° 302.4 (-22.2)	° 232.4 (170.7)	° +26.7 (-7.2)	37 (37)	210 (210)	346c (346)
55.430 C Feb. 25	9523	.891 .697 .764	242.8 37.4 72.2 (-20.4)	235.0 (263.3)	+27.2 (-7.2)	30 (30)	160 (160)	82 37 (119)	63.410 G Mar. 4	9523	.985	298.2 (-22.4)	233.1 (158.2)	+26.1 (-7.2)	42 (42)	158 (158)	403f (403)
56.411 G Feb. 26	942a 9523	.941 .243 .610	243.5 242.0 22.4 (-20.7)	263.1 (250.4)	-13.6 +27.2 (-7.2)	2 76 (78)	5 428 (433)	165 (165)	64.398 G Mar. 5		.977	113.6 (-22.7)	° (145.2)	° (-7.3)	(0)	(0)	113 (113)
57.321 C Feb. 27	9523	.577	5.1 (-20.9)	235.1 (238.4)	+27.7 (-7.2)	78 (78)	480 (480)	(0)	65.609 G Mar. 6		.901	114.1 (-22.9)	° (129.2)	° (-7.3)	(0)	(0)	67 (67)
58.416 G Feb. 28	9523	.589	345.9 (-21.2)	233.3 (224.0)	+27.6 (-7.2)	92 (92)	479 (479)	(0)	66.599 G Mar. 7		.794 .961	115.6 61.8 (-23.2)	° (116.2)	° (-7.2)	(0)	(0)	102 57 (159)
59.484 G Feb. 29	9523	.662	328.1 (-21.5)	233.0 (209.9)	+27.5 (-7.2)	62 (62)	365 (365)	(0)	67.498 G Mar. 8		.668 .896	119.5 57.1 (-23.3)	° (104.4)	° (-7.2)	(0)	(0)	40 103 (143)
60.399 G Mar. 1	9523 942b	.751 .263	316.7 132.0 (-21.7)	233.2 (197.9)	+27.2 -17.1 (-7.2)	54 1 (55)	329 6 (335)	138c (138)	68.376 G Mar. 9		.823	51.5 (-23.5)	° (92.8)	° (-7.2)	(0)	(0)	105 (105)
61.429 G Mar. 2	9523	.849	308.6 (-22.0)	232.4 (184.3)	+27.2 (-7.2)	60 (60)	273 (273)	251c (251)	71.402 G Mar. 12		.929	125.5 (-24.1)	° (52.9)	° (-7.2)	(0)	(0)	51 (51)
									Mar. 10 Mar. 11	No spots or faculae.							

Group 9523. Feb. 25-Mar. 4. An active stream of normal type, rapid in growth and dissolution. The leader, a regular spot, alone survives to the west limb.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924.			°	°	°				1924.			°	°	°			
Mar. 13	}	No	spots or	faculae.					83.330	9525	.910	240.8					90
Mar. 14									C		.439	352.6	259.0	+18.8	o	4	69
											.750	38.4					60
											.846	46.4					60
74.608		.817	242.1					65	Mar. 24			(-25.8)	(255.6)	(-6.9)	(o)	(4)	(219)
G																	
Mar. 15			(-24.6)	(10.7)	(-7.1)	(o)	(o)	(65)									
									84.513		.977	241.2					67
									C		.741	31.2					153
75.471		.902	245.4					87	Mar. 25			(-25.9)	(240.0)	(-6.8)	(o)	(o)	(220)
G																	
Mar. 16			(-24.8)	(359.3)	(-7.1)	(o)	(o)	(87)									
									Mar. 26								
Mar. 17	}	No	spots or	faculae.													
Mar. 18																	
Mar. 19																	
									86.330		.940	175.2					30
									C								
79.402		.954	158.6					54	Mar. 27			(-26.0)	(216.1)	(-6.7)	(o)	(o)	(30)
G		.975	69.3					97									
		.983	63.9					101									
Mar. 20			(-25.3)	(307.5)	(-7.0)	(o)	(o)	(252)									
									87.325		.947	184.1					54
80.326	943a	.049	226.0	297.3	-9.0	2	5		C		.877	297.3					39
C		.914	67.0					66	Mar. 28		.849	281.7					33
		.947	59.8					268				(-26.1)	(203.0)	(-6.7)	(o)	(o)	(126)
Mar. 21			(-25.4)	(295.3)	(-7.0)	(2)	(5)	(334)									
									88.354		.957	293.6					61
									C		.951	278.8					35
81.564	9524	.708	234.0	320.0	-29.8	4	16	720	Mar. 29		.766	312.5					126
	9525	.545	38.8	257.9	+18.6	4	15					(-26.1)	(189.4)	(-6.6)	(o)	(o)	(222)
		.768	59.6					59									
C		.843	53.5					175									
		.940	51.7					165									
		.976	58.0					61	89.401		.905	296.4					37
Mar. 22			(-25.6)	(278.9)	(-6.9)	(8)	(31)	(532)	G		.863	306.8					134
											.789	323.2					106
									Mar. 30			(-26.2)	(175.6)	(-6.6)	(o)	(o)	(277)
82.370	9524	.806	238.4	320.0	-29.3	1	8	920									
	9525	.472	21.7	257.7	+19.2	3	7										
C		.742	48.3					104									
		.889	47.9					164	90.371		.941	301.3					136
		.924	54.3					66	C		.860	317.0					148
Mar. 23			(-25.7)	(268.3)	(-6.9)	(4)	(15)	(426)	Mar. 31			(-26.3)	(162.8)	(-6.5)	(o)	(o)	(284)

Group 9524. Mar. 22-23. A pair of very small spots.

Group 9525. Mar. 22-24. A pair of small spots on Mar. 22 and 23; a single spot on Mar. 24.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.
1924. 91-609 G Apr. 1		930	309.2 (-26.3)	146.5 (146.5)	(- 6.5)	(0)	(0)	147 (147)	1924. 104-611 G Apr. 14	9526	914	305.6 (-26.2)	33.0 (334.8)	+29.2 (-5.6)	5 (5)	26 (26)	900 (90)
92-486 G Apr. 2		967 927	306.3 319.7 (-26.3)	134.9 (134.9)	(- 6.4)	(0)	(0)	96 44 (140)	105-353 C Apr. 15		961 826	303.8 42.8 (-26.2)	325.1 (325.1)	(- 5.5)	(0)	(0)	101 48 (149)
93-536 G Apr. 3		974 804 979	313.6 56.6 53.8 (-26.4)	121.0 (121.0)	(- 6.3)	(0)	(0)	95 32 70 (197)	106-405 G Apr. 16	9527	846	60.7 (-26.1)	259.1 (311.2)	+21.1 (-5.4)	3 (3)	11 (11)	75f (75)
94-337 C Apr. 4		940	50.0 (-26.4)	110.5 (110.5)	(- 6.3)	(0)	(0)	29 (29)	107-353 G Apr. 17	9527	742 941	55.2 62.8 (-26.0)	258.0 (298.6)	+20.9 (-5.4)	17 (17)	49 (49)	1070 112 (219)
Apr. 5		No spots or	faculae.						108-363 G Apr. 18	9527 9528	627 688 890	45.9 127.5 58.5 (-25.9)	256.5 246.9 (285.3)	+21.1 -28.9 (-5.3)	45 26 (71)	183 125 (308)	126 (126)
96-607 G Apr. 6	943b	461	0.3 (-26.4)	80.3 (80.5)	+21.1 (- 6.2)	0 (0)	7 (7)	7 (0)	109-459 G Apr. 19	9527 9529 9528	508 493 552 802	27.8 142.4 139.0 50.1 (-25.8)	256.1 251.0 246.5 (270.8)	+21.6 -27.8 -29.3 (-5.2)	39 10 42 (91)	173 21 230 (424)	87 (87)
Apr. 7 Apr. 8 Apr. 9	}	No spots or		faculae.					110-460 G Apr. 20	9527 9529 9528	461 395 450 937	3.6 165.5 154.6 49.5 (-25.7)	255.8 251.2 244.9 (257.6)	+22.1 -27.5 -28.8 (-5.1)	19 9 40 (68)	86 38 382 (506)	141 (141)
100-329 C Apr. 10		9526	591	356.2 (-26.4)	34.0 (31.4)	+30.1 (- 5.9)	0 (0)	3 (3)	111-365 C Apr. 21	9527 9529 9528	493 385 404 905	341.7 190.5 175.3 44.6 (-25.7)	255.2 250.1 243.4 (245.6)	+22.8 -27.1 -28.6 (-5.0)	11 21 58 (90)	48 131 413 (592)	122 (122)
Apr. 11 Apr. 12 Apr. 13		No spots or		faculae.													

Group 9526. Apr. 10-14. Intermittent. One very small ephemeral spot on Apr. 10; a pair of small spots on Apr. 14.

Group 9527. Apr. 16-22. Revival of Group 9525. A stream of unstable components. The axis of the group is considerably inclined to the solar equator.

Group 9528. Apr. 18-26. A short compact stream appearing near its maximum development almost as a single compound spot. This group closely follows

Group 9529 with which it might have been associated as the following component of a large complex stream. A clear separation, however, is usually seen between the two groups, and their respective developments appear, moreover, to be largely independent.

Group 9529. Apr. 19-27. A short stream immediately preceding Group 9528. A small regular spot leading the stream is the only stable component until the appearance of a similar spot at the rear on Apr. 24.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbraë.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbraë.	Whole Spots.	Faculae.
1924. 112-449 G Apr. 22	9527 9529 9528	.589 .479 .437 .831	321.9 217.7 202.8 38.3 (-25.5)	254.5 250.4 242.4 (231.3)	+23.0 -26.8 -28.5 (-4.9)	2 32 45 (79)	17 220 366 (603)	74 (74)	1924. 120-372 C Apr. 30		.940 .897	311.6 305.1 (-24.4)	° ° (126.6)	° ° (-4.1)	(0) (0)	(0) (0)	145 63 (208)
113-510 C Apr. 23	9529 9528	.732 .629 .546	306.2 231.3 222.5 (-25.4)	250.6 241.9 (217.3)	-27.1 -28.0 (-4.8)	34 46 (80)	147 299 (446)	145 (145)	121-418 C May 1		.969 .954	304.3 61.6 (-24.2)	(112.8)	(-4.0)	(0) (0)	(0) (0)	111 118 (229)
114-353 C Apr. 24	9529 9528	.831 .742 .656	301.7 236.6 231.3 (-25.3)	250.4 241.5 (206.2)	-27.4 -28.0 (-4.7)	53 22 (75)	334 180 (514)	226 (226)	122-450 G May 2		.880 .970	59.8 57.7 (-24.0)	(99.2)	(-3.9)	(0) (0)	(0) (0)	75 113 (188)
115-479 G Apr. 25	9529 9528	.938 .875 .798	296.1 240.5 237.6 (-25.2)	250.5 241.0 (191.3)	-27.8 -28.3 (-4.6)	54 16 (70)	331 157 (488)	333 148c 80c (561)	123-462 G May 3		.909	54.6 (-23.8)	(85.8)	(-3.8)	(0) (0)	(0) (0)	86 (86)
116-328 C Apr. 26	9529 9528	.982 .953 .889	294.6 241.7 239.6 (-25.0)	252.3 241.1 (180.1)	-28.3 -29.0 (-4.5)	36 8 (44)	282 56 (338)	300 425c (725)	124-413 G May 4	944b	.855 .961	50.2 53.5 (-23.6)	23.6 (73.2)	+30.7 (-3.7)	I (I)	2 (2)	99b 88 (187)
117-339 G Apr. 27	9529	.917 .976	297.5 242.0 (-24.9)	244.3 (166.7)	-28.2 (-4.4)	18 (18)	133 (133)	145 559c (704)	125-351 G May 5		.735 .893	41.7 50.2 (-23.5)	(60.8)	(-3.6)	(0) (0)	(0) (0)	115 92 (207)
118-354 G Apr. 28	944a	.992 .701	240.7 319.9 (-24.7)	184.1 (153.3)	+28.6 (-4.3)	2 (2)	8 (8)	214 (214)	126-347 C May 6	944c	.576 .821	333.6 44.8 (-23.2)	64.4 (47.7)	+27.6 (-3.5)	I (I)	4 (4)	63 (63)
119-363 G Apr. 29		.813 .948	310.6 160.0 (-24.6)	(140.0)	(-4.2)	(0)	(0)	71 34 (105)	127-360 G May 7	9530	.711	36.2 (-23.0)	4.7 (34.3)	+31.9 (-3.4)	13 (13)	63 (63)	(0)
									128-450 G May 8	9530	.625	22.1 (-22.8)	3.8 (19.9)	+32.1 (-3.3)	21 (21)	179 (179)	(0)

Group 9530. May 7-14. A short stream showing a brief conformity to the normal type and then rapidly dissipating.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.
1924. 129°355 G May 9	9530	·576	7·9	2·6	+31·5	20	124	(0)	1924. 135°491 C	9531 9532 9533	·972 ·927 ·320 ·727 ·857 ·744 ·881 ·943	303·8 238·6 191·7 130·0 120·0 46·2 59·5 64·0	290·7 —20·7 247·0 230·7 —26·8	83 7 2	495 27 6	339 41 365f 302s 286 38 67	
130°457 G May 10	9530	·944 ·584 ·902	303·1 348·5 110·9	1·1	+31·7	24	103	77 (144)	May 15	9531 9532 9533	·973 ·393 ·628 ·761 ·875 ·936	240·2 216·0 137·9 124·0 60·8 68·6	289·6 —20·8 246·5 230·6 —26·8	92 4 2	646 10 5	60 178f 247s 80 63 (1438)	
131°398 G May 11	9530 9531	·988 ·633 ·786	301·5 333·3 115·1	0·3 291·2	+31·5 —21·4	15 13	44 40	142 (142)	May 16	9531 9532 9533	·973 ·393 ·628 ·761 ·875 ·936	240·2 216·0 137·9 124·0 60·8 68·6	289·6 —20·8 246·5 230·6 —26·8	92 4 2	646 10 5	60 178f 247s 80 63 (1438)	
132°382 G May 12	9530 9531 9532	·878 ·728 ·658 ·981 ·962	312·0 319·9 120·2 120·0 64·6	0·9 290·3 249·4	+31·3 —21·5 —29·9	4 57 5	18 207 33	81 220c 170s 423 (894)	May 17	9531 9532 9534	·538 ·522 ·995 ·744 ·836	233·1 152·5 112·9 55·2 64·7	289·4 —20·8 246·1 177·7 —23·0	99 4 0	542 8 34	93 128 (221)	
133°627 G May 13	9530 9531 9532	·966 ·857 ·455 ·910 ·876 ·972 ·987	304·9 310·1 133·5 121·6 59·8 118·3 72·1	1·7 290·8 248·5	+31·8 —20·7 —29·7	2 50 18	8 313 64	95 314c 214s 398 188 67 (1276)	May 18	9531 9532 9533 9534	·705 ·465 ·953 ·950	241·3 176·5 49·4 113·2	288·7 —21·4 181·8 176·4 (247·3)	61 1 7 16	376 4 24 47	120c 126sf 161c (407)	
134°352 G May 14	9530 9531 9532 9533	·915 ·360 ·846 ·947 ·795 ·950	306·5 149·9 124·0 117·5 55·8 71·9	1·3 290·7 248·1 231·8	+31·6 —20·8 —29·8 —26·8	0 54 9 2	7 327 48 12	225c 172f 220c 202 57 (876)	May 19	9531 9532 9533 9534	·933 ·951 ·799 ·723	299·5 248·8 38·5 119·5	290·3 —20·7 +37·1 —22·2 (—19·5)	28 5 13 (46)	187 15 66 (268)	77 482c 238f 107f (904)	

Group 9531. May 11-21. Two spots 5° apart in longitude. The leader survives after changes of structure between May 14 and 17. The follower, however, is more unstable and is succeeded by a cluster represented latterly by an indefinitely formed spot.

Group 9532. May 12-24. Return of Group 9529. Intermittent. A small regular spot diminishing to a dot on May 18. Nothing is then visible until May 22, when a few small spots make their appearance in the faculae marking the disturbed region.

Group 9533. May 14-16. Revival near the place of Group 9528. A single very small spot.

Group 9534. May 17-27. A small regular spot gradually dying out. A small follower is seen on May 23 and 24.

Group 9535. May 18-28. Intermittent. A small but persistent spot, in high northern latitude, followed by faculae in which small-spots appear on May 21.

The group has disappeared by May 25, but three ephemeral spots are seen on May 28.

POSITIONS AND AREAS OF SUN SPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.
1924. 141.353		.781	303.1	°	°			126	1924. 147.382		.793	3 3.3	°	°			304
G	9531	.992	249.8	291.8	-20.2	4	160	295f	C	9534	.743	241.5	173.8	-21.5	1	6	107c
	9534	.614	125.3	176.6	-22.2	11	59			9536	.358	16.9	123.1	+18.9	10	47	
May 21	9535	.782	36.1	173.8	+37.6	17	63	127c	May 27			(-17.3)	(129.4)	(-1.1)	(11)	(53)	(411)
			(-19.3)	(209.2)	(-1.8)	(32)	(282)	(548)									
142.360		.887	298.7					271	148.359		.846	243.8					79
		.836	308.7					56	G	9535	.884	314.9	168.8	+37.9	8	29	167c
G	9532	.820	231.3	244.6	-31.9	0	3	207p	May 28	9536	.366	342.3	123.2	+19.3	3	32	
	9534	.468	137.9	176.2	-21.8	10	48					(-16.9)	(116.5)	(-1.0)	(11)	(61)	(246)
	9535	.699	26.5	173.0	+37.0	19	92										
May 22	945a	.553	71.5	164.0	+8.6	1	2										
			(-18.9)	(195.9)	(-1.7)	(30)	(145)	(534)									
143.364		.950	295.6					133	149.364		.936	312.0					316
		.915	303.7					63	G		.924	246.3					110
G	9532	.907	237.1	244.2	-30.2	16	59	292c	May 29	9536	.883	280.9	126.3	+18.0	0	8	59
	9534	.363	161.2	175.4	-21.6	6	28			9537	.998	58.9	18.6	+30.9	74	442	
May 23	9535	.645	11.3	173.5	+37.5	18	67					(-16.5)	(103.2)	(-0.9)	(74)	(450)	(485)
			(-18.6)	(182.6)	(-1.6)	(40)	(154)	(488)									
144.411		.976	301.3					101	150.378		.967	309.6					207
		.882	240.1					148	G		.982	57.5	13.6	+31.7	127	969	355c
G	9532	.972	238.3	243.3	-31.0	6	38	396c	May 30	9537		(-16.2)	(89.8)	(-0.8)	(127)	(969)	(562)
	9534	.355	195.9	174.7	-21.4	6	25										
May 24	9535	.629	353.8	173.6	+37.1	7	24										
			(-18.3)	(168.7)	(-1.5)	(19)	(87)	(645)									
145.461		.990	234.3					117	152.446		.893	292.4					155
		.933	236.7					170	C		.886	222.4					90
G		.690	337.7					55		9539	.181	284.4	72.5	+2.0	1	4	
May 25	9534	.469	222.1	174.5	-21.6	6	10	(342)	June 1	9537	.836	50.7	13.2	+31.5	106	868	465c
			(-17.9)	(154.8)	(-1.4)	(6)	(10)					(-15.4)	(62.4)	(-0.5)	(107)	(872)	(710)
146.352		.961	237.4					80	153.593		.972	290.4					117
		.945	292.8					33		9539	.391	280.7	69.7	+3.8	1	4	
G		.726	330.2					145	G	9537	.727	43.2	11.6	+31.5	123	878	
May 26	9534	.597	233.8	174.1	-21.6	4	6	(258)	June 2	9538	.771	130.0	4.4	-29.9	0	7	64nf
			(-17.6)	(143.0)	(-1.2)	(4)	(6)					(-15.0)	(47.2)	(-0.4)	(124)	(889)	(181)

Group 9536. May 27-29. A few unstable spots.

Group 9537. May 29-June 11. A very large stream, 14° in length, of which the leader is the predominating spot. The other components are mostly unstable aggregations of indefinite markings, showing a tendency on some days to condense to definite spots.

Group 9538. May 31-June 2. A very small spot seen on May 31 and June 2.

Group 9539. June 1-2. A very small spot.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.
1924. 154.422 G June 3	9537	.645	34.6 (-14.7)	10.9 (36.3)	+31.6 (-0.3)	160 (160)	892 (892)	(0)	1924. 161.304 G June 10	9537 9541	.930 .662 .865 .971	303.1 55.9 121.5 113.8 (-11.9)	9.1 268.2 +22.2 (304.4)	+30.7 +22.2 (+0.6)	77 1 (78)	506 4 (510)	553c 84 70 (707)
155.391 C June 4	9537	.740 .558	273.3 19.4 (-14.3)	10.9 (23.4)	+31.4 (-0.2)	123 (123)	1013 (1013)	100 (100)	162.585 G June 11	9537 9540 9541	.990 .387 .482 .891 .923 .934 .970	301.1 183.4 40.2 117.6 131.1 66.0 123.2 (-11.4)	8.9 289.6 268.6 +30.9 -22.0 +22.2 (288.2)	+30.9 -22.0 +22.2 (+0.7)	70 0 3 15 (73)	544 3 15 (562)	633nf 118 146 70 81 (1048)
156.412 G June 5	9537	.869 .520 .984	272.8 0.5 112.3 (-13.9)	9.6 (9.9)	+31.3 (0.0)	130 (130)	1076 (1076)	62 310 (372)	163.360 G June 12	9541 946a	.982 .397 .850 .731 .814 .900 .925	303.9 23.7 64.1 135.1 121.2 133.5 123.7 (-11.1)	268.1 222.6 +22.0 +22.1 (278.0)	+22.0 +22.1 (+0.8)	4 1 (5)	24 5 (29)	471 55c 74 53 58 58 (769)
157.370 G June 6	9537	.957 .938 .549 .939 .959	272.3 293.1 341.5 113.9 64.3 (-13.5)	8.9 (357.2)	+31.2 (+0.1)	135 (135)	1101 (1101)	76 80 602 40 (798)	164.375 C June 13	9541 9542	.366 .526 .791 .799	350.2 146.8 129.4 140.1 (-10.6)	268.3 246.0 +22.0 -25.1 (264.5)	+22.0 -25.1 (+0.9)	14 9 (23)	64 26 (90)	164 103 (267)
158.439 C June 7	9537 9540	.633 .830 .971	325.1 115.9 68.5 (-13.1)	8.1 290.1 (343.1)	+31.3 -21.1 (+0.2)	148 1 (149)	984 5 (989)	497s 92 (589)	165.467 G June 14	9541 9542	.734 .462 .441	234.4 322.0 172.0 (-10.2)	267.9 246.2 (250.1)	+22.3 -24.7 (+1.1)	24 10 (34)	148 34 (182)	128 (128)
159.303 G June 8	9537	.729 .737 .922 .968	314.3 122.1 66.2 115.5 (-12.7)	8.9 (331.7)	+30.7 (+0.3)	111 (111)	728 (728)	276c 259 51 55 (641)	166.387 G June 15	9541 9542	.806 .615 .462	239.6 306.9 198.0 (-9.8)	270.0 246.9 (237.9)	+22.7 -24.7 (+1.2)	39 8 (47)	223 41 (264)	372 (372)
160.375 G June 9	9537	.843 .937	306.9 117.1 (-12.3)	8.9 (317.5)	+30.6 (+0.4)	94 (94)	630 (630)	362c 96 (458)									

Group 9540. June 7-11. A single small spot seen only on June 7 and 11, representing a feeble revival in the faculae accompanying Group 9537 of the previous rotation.

Group 9541. June 10-18. Two or three small spots on June 10-13, becoming a short-lived stream of normal type.

Group 9542. June 13-19. At first a few small spots in a stream, which later shows a tendency to normal type near the west limb.

POSITIONS AND AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 167-345			°	°	°				1924.			°	°				
G	9541	°900	243.2	271.0	+22.5	36	199	310	174-359		°716	306.3	139.7	+36.8	12	83	114
	9542	°760	299.1	247.2	-24.9	7	22	136c	G	9543	°581	349.9	72.2	+25.0	0	2	58
June 16		°559	217.7	(-9.3)	(225.2)	(+ 1.3)	(43)	(221)	946b	°887	62.7	(-6.3)	(132.4)	(+ 2.1)	(12)	(85)	72
		°961	47.5					(556)	June 23	°930	68.9						(244)
168-570		°963	243.6					291	175-395	9544	°846	300.6	173.1	+26.8	1	13	129c
G	9541	°939	307.8	273.0	+22.9	40	185	16	G	9543	°640	333.0	139.9	+36.7	15	93	
June 17	9542	°912	294.6	247.1	-25.0	14	71	284f	June 24		(-5.8)	(118.7)	(+ 2.2)	(16)	(106)	(129)	
		°714	231.8	(-8.8)	(209.0)	(+ 1.4)	(54)	(256)									
		°908	44.9					(691)	176-301	9544	°921	298.6	171.8	+27.1	6	23	233c
									G	9543	°718	322.8	139.4	+36.7	13	86	
169-506	9541	°973	293.4	272.4	+23.1	17	89	343f	June 25			(-5.4)	(106.7)	(+ 2.3)	(19)	(109)	(233)
G	9542	°827	237.8	247.0	-25.1	19	91	194c									
June 18		°839	39.0					98	177-304	9544	°975	297.9	169.9	+27.7	0	43	320c
		°946	48.5	(-8.4)	(196.6)	(+ 1.5)	(36)	(180)	G	9543	809	314.9	138.7	+36.5	14	85	155f
								(687)	June 26			(-4.9)	(93.4)	(+ 2.5)	(14)	(128)	(475)
170-397		°988	292.3					195									
G	9542	°919	241.6	247.8	-25.1	12	72	324c	178-367	9543	°899	310.1	138.1	+36.7	17	68	219f
June 19	9543	°832	45.4	137.3	+36.7	13	44	81c	G	9545	°988	58.5	358.5	+31.5	50	413	300c
		(-8.0)	(184.8)	(+ 1.6)	(25)	(116)	(600)		June 27			(-4.5)	(79.3)	(+ 2.6)	(67)	(481)	(519)
171-583		°974	242.4					234									
G		°880	225.0					77	179-304	9543	°955	307.6	136.9	+36.5	2	5	215f
9544	°829	238.4						111	G	9545	°949	57.0	357.3	+32.0	64	392	499c
June 20	9543	°422	352.7	172.5	+26.4	3	9		June 28		°992	111.8					34
		°716	35.5	137.8	+37.1	17	99	(422)				(-4.0)	(66.9)	(+ 2.7)	(66)	(397)	(748)
		(-7.5)	(169.1)	(+ 1.8)	(20)	(108)											
172-360		°929	240.6					114	180-422		°969	308.9					295
G	9544	°468	333.8	172.1	+26.5	5	18		G	9545	°868	53.8	356.3	+32.3	60	316	739c
June 21	9543	°650	25.8	138.0	+37.4	11	102	(114)	June 29		°935	114.0					110
		(-7.2)	(158.8)	(+ 1.9)	(16)	(120)						(-3.5)	(52.1)	(+ 2.8)	(60)	(316)	(1144)
173-395		°961	240.0					101									
G	9544	°582	316.5	171.6	+26.6	2	4		181-421	9545	°772	48.9	355.5	+32.5	39	271	407f
9543	°579	6.1	140.7	+36.9	17	86			G		°844	118.4					73
June 22		°966	65.3					44	June 30		°953	63.1					139
		(-6.7)	(145.1)	(+ 2.0)	(19)	(90)		(145)				(-3.1)	(38.9)	(+ 2.9)	(39)	(271)	(619)

Group 9543. June 19-28. A group of "stream" type, in high northern latitude, consisting of a small regular spot followed by a tiny cluster which has disappeared by June 24.

Group 9544. June 20-26. A small group of insignificant spots; none are seen on June 23.

Group 9545. June 27-July 9. Return of Group 9537. A pair of nearly regular spots about 24° apart in longitude, with occasional very small companions. The following spot shows instability from July 1-3, but it regains its normal appearance before finally disappearing as a tiny spot after July 7. The two spots partake of a common retrograde motion in longitude. The position given on July 9 is that of an ephemeral companion spot.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924 182:368	9545	·674	41°4	354°4	+32°8	37	226	447f	1924. 188:570		·673	329°9					190
G	9546	·851	71°2	328°9	+17°5	2	16	47c		9545	·789	309°0	350°6	+32°3	7	39	335n
July 1	9547	·868	61°4	328°5	+26°1	18	89	170c		9546	·534	302°3	332°8	+19°8	24	120	
			(-2°6)	(26°3)	(+3°0)	(57)	(331)	(664)		9548	·578	138°6	280°0	-22°2	0	16	
									G	9550	·897	121°5	246°2	-26°0	1	17	1022f
										9549	·930	67°6	236°4	+22°1	83	527	296c
											·818	85°7					53
											·978	116°8					94
183:478	9545	·563	27°7	353°6	+32°7	28	208		July 7			(+0°2)	(304°3)	(+3°7)	(115)	(719)	(1990)
G	9546	·712	66°5	328°3	+18°7	6	32										
July 2	9547	·744	57°7	327°7	+25°6	18	79										
		·986	116°2					108									
			(-2°1)	(11°7)	(+3°1)	(52)	(319)	(108)									
									189:308		·924	300°8					95
184:435	9545	·504	9°7	353°2	+32°8	35	191			9545	·768	315°3					239
G	9546	·525	58°3	331°0	+18°8	9	36			9546	·854	305°9	349°1	+32°2	1	13	375n
July 3	9547	·618	49°6	327°5	+26°2	16	57			9546	·659	296°5	333°2	+19°9	23	121	
		·949	118°2					126	G	9548	·947a	309°8	306°4	+32°1	1	8	
			(-1°7)	(359°0)	(+3°2)	(60)	(284)	(126)		9548	·498	151°9	279°9	-22°4	0	20	
185:497	9545	·502	348°2	351°9	+32°6	29	172			9550	·825	125°4	246°2	-26°1	1	7	508f
G	9546	·366	41°6	330°1	+19°0	16	47		July 8	9549	·860	65°7	236°4	+21°8	82	476	261c
July 4	9547	·486	37°2	325°9	+25°8	14	26				·759	129°1					397
		·849	123°8					169			·947	118°7					176
		·930	118°9					144				(+0°5)	(294°5)	(+3°7)	(108)	(645)	(2051)
		·974	68°0					135									
			(-1°2)	(344°9)	(+3°3)	(59)	(245)	(448)	190:350		·843	312°6					199
186:368	9545	·558	332°2	351°3	+32°7	34	149			9545	·746	302°6					136
G	9546	·281	16°1	328°7	+18°9	25	132			9546	·970	304°6	355°9	+34°4	0	20	685f
July 5	9547	·403	18°8	325°2	+25°7	5	21			9551	·812	292°0	333°7	+20°0	17	99	323c
	9548	·851	118°4	279°8	-21°8	0	4	188s		9552	·616	140°0	255°0	-24°7	1	9	
		·783	128°9					145		9550	·494	86°0	251°2	+5°3	18	44	
		·913	66°6					194		9550	·741	132°9	243°2	-27°2	4	13	399f
		·986	116°7					280	July 9	9549	·728	63°2	236°4	+21°8	87	426	210c
			(-0°8)	(333°4)	(+3°4)	(64)	(306)	(807)			·879	122°0					241
187:402	9545	·673	317°8	352°1	+32°9	20	119	114c	191:307		·958	305°1					372
G	9546	·335	327°2	330°8	+19°8	24	122				·838	298°3					217
July 6	9548	·715	125°3	281°0	-21°5	5	17	65s		9546	·870	311°4					172
	9549	·990	68°4	237°5	+21°8	34	213	192f		9551	·915	290°6	333°8	+20°4	14	97	
		·833	64°1					189	G	9552	·526	154°4	253°6	-24°4	0	4	
		·934	84°6					55		9552	·292	86°4	251°1	+4°7	16	94	
		·937	118°6					529		9550	·641	143°6	242°7	-27°5	4	22	
		·983	118°7					468	July 10	9549	·586	57°7	236°0	+21°4	57	392	271f
			(-0°3)	(319°7)	(+3°6)	(83)	(471)	(1612)			·856	128°9					104
												(+1°4)	(268°0)	(+3°9)	(91)	(609)	(1136)

Group 9546. July 1-11. A few unstable spots in a stream from which a small regular spot emerges as the leader on July 6.

Group 9547. July 1-5. A small unstable stream on the same meridian as Group 9546.

Group 9548. July 5-8. Two or three very small spots in the northern part of a region of dispersing faculae.

Group 9549. July 6-19. A stream of normal type, but in which the leader shows signs of being somewhat unstable, and the follower, which, although small, is unusually persistent.

Group 9550. July 7-12. Revival of Group 9542. One or two very small spots in conspicuous faculae.

Group 9551. July 9-10. One or two small spots in faculae β Group 9550.

Group 9552. July 9-17. A large stream of normal type in low latitude, developing rapidly from a few spots seen on July 9 in a position lightly marked by faculae at the east limb on July 6 and 7. The leader, when completely developed, is a well-defined regular spot; the follower, as usual, is composite and is very short-lived. The appearance of so large a group in equatorial latitudes within a year of the minimum is abnormal.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 192.349		°971 °942 °799	307.2 297.3 308.6	°	°			152. 184 99	1924. 197.517		°941 °860 °945	239.2 230.6 274.0	°	°			521 275 472c
G	9546 947b	°984 °337	290.1 326.3	334.5 265.6	+20.5 +20.1	19 1	99 3	243f	G	9552 9549	°777 °979	294.2 48.6	256.9 235.3	+ 5.3 +21.5	48 51	269 314	472c 204c 67
	9552 9550 9549	°028 °557 °424	21.7 160.5 43.1	253.6 242.1 236.1	+ 5.5 -27.6 +21.7	54 4 58	278 14 345		July 16			(+ 4.2)	(185.9)	(+ 4.6)	(99)	(583)	(1539)
July 11		°987	62.7					103 (781)	198.305		°970 °890	241.0 233.8	°	°			291 452
			(+1.9)	(254.2)	(+4.0)	(136)	(739)		G	9552 9549	°991 °870	274.9 292.6	257.7 235.1	+ 5.5 +21.9	58 44	238 297	421f 599c
193.306		°992 °981 °892 °884	288.1 297.5 304.7 242.9					130 43 68 60	July 17		°935	47.9	(+4.6)	(175.4)	(+4.6)	(102)	96 (1859)
G	9552 9550 9549	°218 °531 °313	276.7 180.5 17.3	254.1 241.9 235.9	+ 5.5 -27.9 +21.4	98 0 43	496 5 240		199.405		°984 °915 °962	237.5 238.3 291.5					101 73 555c
July 12		°964	60.7	(+2.3)	(241.6)	(+4.1)	(141)	(741)	G	9549	°903	44.5	235.5	+22.0	38	220	116 (845)
								(521)	July 18			(+5.1)	(160.9)	(+ 4.7)	(38)	(220)	
194.367		°982 °972 °880	353.4 302.4 239.4					28 142 435	200.374	9549 947c	°995 °491 °803	292.0 48.3 43.3	233.8 124.7	+22.4 +23.4	0 0	207 2	161c
C	9552 9549	°457 °331 °895	273.4 334.7 59.5	254.6 236.2	+ 5.3 +21.5	91 38	497 197		G		°958	98.9					146 101 (408)
July 13			(+2.8)	(227.5)	(+4.2)	(129)	(694)	251 (856)	July 19			(+5.5)	(148.1)	(+ 4.8)	(0)	(209)	
195.306		°935 °754 °639	241.6 227.4 272.9					150 302	201.347 G	9553	°920 °911	71.1 112.5	68.2	+19.2	1	8	186sf 48 (234)
G	9552 9549	°445 °806	313.5 56.0	254.8 235.4	+ 5.2 +21.8	76 41	452 243		July 20			(+5.9)	(135.2)	(+ 4.9)	(1)	(8)	
July 14				(+3.2)	(215.1)	(+4.3)	(117)	(695)	202.453	9554	°729 °579 °790	305.0 47.3 68.6	163.2 92.1 69.3	+28.3 +27.5 +19.9	2 4 4	8 18 13	149c 89sf (238)
196.307		°976 °873 °853	243.1 292.5 233.9					139 156 345	203.357	9554	°856	298.2	165.9	+26.6	12	40	254f
G		°723	219.5					171		9555	°473	35.6	90.6	+27.4	18	53	
	9552 9549	°804 °607	273.2 300.9	255.4 235.9	+ 5.2 +21.8	59 32	388 231	236c	G	9553	°653 °931	65.1 16.0	69.7	+19.9	1	3	55sf 69 (378)
July 15			(+3.7)	(201.9)	(+4.4)	(91)	(619)	(1047)	July 22			(+6.8)	(108.6)	(+ 5.1)	(31)	(96)	

Group 9553. July 20-24. A very small but definite spot.

Group 9554. July 21-23. Revival of Group 9544 of the previous rotation. Two small spots in the preceding part of a faculous area. There is also a very small companion on July 21 in the rear of the disturbed area.

Group 9555. July 21-29. A stream of generally insignificant spots.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.
1924. 204.370	9554 947d	.949 .827	296.4 324.4	167.0 138.9	+26.7 +46.0	19 2	80 5	309f 37s	1924. 210.369		.950 .788	313.5 291.3					152 91
G	9555	.387	7.6	91.9	+27.6	9	33			9555	.949 .559	295.1 28.2	87.7 357.1	+25.5 +34.7	20 34	128 153	423c
July 23	9553	.486	55.9 (+7.2)	69.9 (95.2)	+20.4 (+ 5.2)	1 (31)	3 (121)	(346)	G	9556	.716 .729 .837 .839 .893 .953	62.3 41.0 46.3 64.5 55.1 46.7					136 140 121 83 70 104
205.364		.953 .898	299.8 319.0					269 114	July 29		(+ 9.7)	(15.8)	(+ 5.6)	(54)	(281)	(1320)	
G	9555	.434	335.5	93.8	+28.3	20	85										
July 24	9553	.324	36.9 (+7.6)	70.1 (82.0)	+20.1 (+ 5.3)	1 (21)	5 (90)	(383)									
206.397	9555	.528	319.6	91.2	+28.6	7	26		211.411		.988 .911	296.4 290.2					151 109
G	9556	.967 .988	55.5 53.7 (+8.1)	352.9 (68.4)	+34.7 (+ 5.3)	0 (7)	6 (32)	106n 135 (241)	G	9556 9557	.499 .945 .869	9.8 50.6 44.5 (+10.2)	356.2 280.5 (2.1)	+34.9 +39.7 (+ 5.7)	30 0 (30)	162 18 (180)	213s 162 (635)
July 25									July 30								
207.392	9555	.646	309.1	89.8	+28.4	7	19	125c	212.363	9556	.499	349.2	356.0	+35.0	25	171	
G	9556	.896 .955 .980 .980	53.7 53.8 67.9 72.3 (+8.5)	354.0 (55.2)	+34.7 (+ 5.4)	15 (22)	54 (73)	185c 372 130 91 (903)	G	9557	.945 .869	52.3 40.7 (+10.5)	279.5 (349.5)	+37.4 (+ 5.8)	4 (29)	25 (196)	268n 75 (343)
July 26									July 31								
208.315	9555	.813	319.1	90.9	+28.0	4	14	87 172c	213.383	9556	.564	330.3	355.8	+34.8	25	192	
G	9556	.775 .794 .888 .937 .956 .961	302.1 49.5 51.5 68.1 52.4 74.9 (+8.9)	355.8 (55.2)	+34.8 (+ 5.5)	46 (50)	183 (197)	133c 249 159 190 50 (1040)	C	9557 9558	.874 .961 .807 .908 .922	49.5 85.9 33.1 123.7 67.5 (+10.9)	279.0 261.9 (336.0)	+37.8 + 5.5 (+ 5.9)	3 53 (81)	24 308 (524)	154c 353f 71 119 115 (812)
July 27									Aug. 1								
209.188	9555	.886	314.7	87.1	+26.5	12	68	108	214.427	9556	.670	317.0	355.6	+34.3	40	180	187c
K	9556	.840 .686 .850 .851	298.1 42.8 49.2 67.0 (+ 9.2)	357.0 (31.4)	+34.8 (+ 5.6)	31 (43)	159 (227)	286c 321 172 (887)	G	9557 9558	.785 .871 .910 .961 .989	44.0 86.8 67.6 120.9 69.1 (+11.4)	278.1 261.5 (322.2)	+38.6 + 5.7 (+ 5.9)	8 43 (91)	18 251 (449)	534f 57 255 174 (1207)
July 28									Aug. 2								

Group 947d. July 23. A very small distinct spot in high latitude, visible also on the Cape photograph taken 30 minutes earlier.
 Group 9556. July 25-Aug. 6. A stream pertaining to the normal type in which the following component is never conspicuous. This group, which is an entirely new formation, precedes a well-defined area of faculae, which represents the place of Group 9545.
 Group 9557. July 30-Aug. 4. A short stream of small components, of which one at the rear alone remains on Aug. 4.
 Group 9558. Aug. 1-13. Return of Group 9552. A small regular spot, with a few tiny companions on Aug. 7, 8, and 11.

POSITIONS AND AREAS OF SUN SPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 215.362	9556	.780	310.1	355.9	+34.4	31	153	241f	1924. 220.366		.919	306.1					253
	948a	.583	333.3	328.9	+36.9	1	2	100b			.670	325.8					249
	9557	.698	37.2	277.2	+38.8	3	8	103c		9561	.642	230.3	274.9	-18.8	3	8	
G	9558	.749	87.6	261.2	+5.8	49	253	300f	G	9558	.304	270.0	261.3	+6.0	55	218	
	9559	.925	61.9	242.3	+28.2	8	25	130c		9560	.384	35.0	229.7	+24.3	8	21	
	9560	.973	66.3	232.0	+24.4	21	89	277c			.951	61.6					254
		.929	123.8					470	Aug. 8			(+13.6)	(243.6)	(+6.3)	(66)	(247)	(756)
Aug. 3			(+11.7)	(309.8)	(+6.0)	(113)	(530)	(1711)									
216.387		.728	316.7					272	221.377		.927	307.6					133
	9556	.880	306.3	355.6	+34.6	37	134	406f			.762	318.9					245
	9557	.642	27.5	273.5	+40.2	1	2	97c			.622	199.2					217
G	9558	.573	88.5	261.3	+5.8	46	226		G	9561	.778	239.1	275.0	-19.0	8	32	89c
	9559	.817	59.9	243.4	+27.9	9	33	122f		9558	.519	271.2	261.6	+6.1	50	227	
	9560	.907	65.6	231.2	+24.7	13	80	452c		9560	.306	2.8	229.4	+24.1	5	18	
		.873	127.7					624			.615	170.1					100
Aug. 4			(+12.1)	(296.3)	(+6.1)	(106)	(475)	(1973)	Aug. 9		.925	60.6	(+14.0)	(230.3)	(+6.4)	(63)	(277)
																	(1011)
217.352		.820	294.7					134	222.417		.966	306.4					70
		.798	312.4					291			.845	315.0					221
	9556	.948	304.3	354.7	+34.3	26	109	382f			.718	216.0					168
G	9558	.375	89.5	261.5	+5.8	60	265			9561	.889	245.2	274.7	-18.6	0	13	121c
	9559	.690	54.9	243.9	+28.0	4	10	117f	G	9558	.712	272.2	262.0	+6.1	43	204	144sf
	9560	.807	63.9	230.9	+24.5	17	67	335c		9560	.364	327.8	228.7	+24.1	1	4	
		.736	137.7					268			.800	56.0					105
Aug. 5		.860	128.5					300	Aug. 10		.927	61.4	(+14.4)	(216.5)	(+6.4)	(44)	(221)
			(+12.5)	(283.5)	(+6.1)	(107)	(451)	(1827)									(997)
218.482		.916	292.7					124	223.391		.963	248.2					106
		.774	313.7					228			.913	311.8					243
	9556	.993	304.1	354.2	+34.5	20	110	531f			.880	238.0					115
G	9558	.126	92.1	261.3	+5.8	57	230				.806	223.4					258
	9559	.534	43.3	244.0	+28.4	1	7		G		.684	207.0					166
	9560	.654	59.7	230.4	+24.1	14	61	234f		9558	.852	273.2	262.2	+6.1	41	223	301sf
		.656	152.3					239		9560	.510	303.2	230.9	+22.0	0	3	
Aug. 6		.793	135.3					323	Aug. 11		.852	59.1	(+14.8)	(203.6)	(+6.5)	(41)	(226)
			(+12.9)	(268.5)	(+6.2)	(92)	(408)	(1679)									121
219.615		.982	292.6					65	224.373		.963	311.1					196
		.961	306.6					181			.936	242.1					57
		.845	311.0					89			.890	231.0					264
G	9561	.518	215.8	272.2	-18.8	1	5		G		.734	219.1					82
	9558	.135	268.4	261.4	+6.0	45	257			9558	.947	274.3	262.2	+6.1	46	257	181sf
	9560	.484	48.4	230.3	+24.4	11	46			9562	.780	229.3	231.5	-25.6	6	13	31c
		.754	144.9					138	Aug. 12			(+15.1)	(190.7)	(+6.6)	(52)	(270)	(811)
Aug. 7			(+13.4)	(253.6)	(+6.3)	(57)	(308)	(473)									

Group 9559. Aug. 3-6. A small definite spot with a companion on Aug. 3.

Group 9560. Aug. 3-11. Return of Group 9549. A small regular spot, decreasing to a tiny marking before extinction.

Group 9561. Aug. 7-10. A related pair of small spots in faculae, showing no development.

Group 9562. Aug. 12-14. A small group, developing towards the west limb, near the place occupied in the previous rotation by Group 9550.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.				
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.		
1924. 225°37°			°	°	°				1924. 231°39'			°	°						
G	9558	.977	313.4					83	Aug. 19	9563	.862	300.3					129		
		.960	265.6					30			.489	66.7	70.0	+17.2	61	298			
		.947	233.4					234			.953	63.5	(+17.5)	(97.9)	(+ 6.9)	(61)	(298)		
		.857	227.2					64									147		
		.831	294.7					210									(276)		
Aug. 13	9562	.995	275.4	262.1	+ 6.0	43	153	186sf	232°44.8	9563	.907	300.9					175		
		.870	235.6	230.0	-25.4	17	65	163c			.262	50.0	71.8	+16.4	40	203			
			(+15.4)	(177.5)	(+ 6.6)	(60)	(218)	(970)			.877	61.8	(+17.8)	(83.9)	(+ 6.9)	(40)	(203)	136	
226°39.9		.986	236.3					123	Aug. 20	9563									
G	9562	.931	233.5					93											
		.894	294.2					306											
		.882	225.3					123			233°37.9	.928	297.0						104
		.947	240.4	229.3	-25.3	23	100	241c			G	.161	341.3	74.7	+15.7	33	176		
		.948	63.8	(+15.8)	(163.9)	(+ 6.6)	(23)	(100)	229	Aug. 21		(+18.1)	(71.6)	(+ 7.0)	(33)	(176)	(104)		
227°36.7		.990	242.5					93	Aug. 22	9563	.313	298.6	75.1	+15.3	30	149			
G	9563	.927	230.1					84					.940	55.0					
		.917	296.0					157			G	.956	65.2	(+18.4)	(58.6)	(+ 7.0)	(30)	(149)	
		.981	74.6	71.0	+16.4	35	279	439c										191	
		.899	64.1					359			Aug. 22							79	
		.958	48.8	(+16.1)	(151.1)	(+ 6.7)	(35)	(279)	83							(270)			
								(1215)	235°41.6	9563	.507	287.5	74.6	+14.9	31	169			
228°38.0	9563	.969	298.9					74					.909	65.9					
		.949	231.5					108			G	.916	53.4	(+18.7)	(44.7)	(+ 7.0)	(31)	(169)	
		.925	74.6	69.3	+16.8	51	359	384c			Aug. 23							151	
		.810	61.5					252										214	
		.927	46.1	(+16.5)	(137.7)	(+ 6.7)	(51)	(359)	77							(365)			
								(895)	236°22.9	9563	.809	299.4							
Aug. 16	9563	.653	284.9					284.9					.853	64.6	74.6	+15.0	28	176	
		.853	64.6					179c			D	.865	53.3	(+19.0)	(34.0)	(+ 7.0)	(28)	(176)	
		.865	53.3								Aug. 24								
229°60.9		.786	73.8	69.5	+16.9	60	357	179c	237°37.6	9563	.895	295.7							
G	9563							125					.824	283.1	74.7	+14.8	26	165	
		.995	251.2								C	.820	49.6						
		.642	71.2	69.4	+17.2	49	301	(301)			Aug. 25		.940	52.5	(+19.3)	(18.8)	(+ 7.1)	(26)	(165)
			(+17.2)	(108.7)	(+ 6.8)	(49)		(125)											416
																	302f		
230°57.5																	156		
Aug. 18	9563																154		
																	(1028)		

Group 9563. Aug. 15-27. A stream of normal type, of which the first stages of its development have taken place when it comes into view at the east limb. The leader preserves its regular form until it reaches the west limb, when it has apparently divided into two parts. This division is preceded by the appearance of a "bright" bridge, seen first on Aug. 22. The follower, 12° behind the leader, has diminished to a dot on Aug. 21; it has disappeared on Aug. 22, but reappears temporarily on Aug. 23 and 24.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 238°358 C Aug. 26	9563	.944 .926	294°2 282°8 (+19°6)	74°4 (5°8)	+14°5 (+7°1)	10 (10)	140 (140)	335 415f (750)	1924. 245°328 C	9564 9565	.923 .891 .882 .578 .172 .806 .888 .987	238°5 308°5 295°0 297°7 104°7 139°9 124°9 110°5	307°0 264°2 +21°6 +4°6	214 30	1281 180		86 128 210
239°387 G Aug. 27	9563	.988	283°5 (+19°9)	74°5 (352°2)	+14°4 (+7°1)	16 (16)	82 (82)	376f (376)	Sept. 2								336 336 88
240°331 C Aug. 28	9564 9565	.985 .548 .971 .977	290°0 62°5 86°8 49°9 (+20°1)	308°6 263°5 (339°8)	+20°8 +4°8 (+7°1)	14 57 (71)	60 211 (271)	282 314c 255 (851)	246°622 G	9564 9565	.917 .772 .139 .729 .739 .915 .927	309°1 291°6 251°9 150°2 135°2 113°2 129°4	306°9 264°3 +21°2 +4°7	177 32	1275 176		144 348c 223 249 213 187
241°462 G Aug. 29	9564 9565	.369 .876	44°5 88°5 (+20°5)	308°7 263°6 (324°8)	+22°1 +4°8 (+7°2)	113 52 (165)	624 197 (821)	321f (321)	Sept. 3								
242°475 G Aug. 30	949a 9564 9565	.614 .262 .735 .927 .950	214°3 111°1 90°4 120°7 43°5 (+20°7)	333°5 308°3 264°1 (311°4)	-23°7 +22°0 +4°6 (+7°2)	0 216 37 (253)	2 990 185 (1177)	278f 117 141 (536)	247°343 C	9564 9565	.858 .301 .863 .879 .985	290°7 262°8 116°6 136°0 70°4 (+22°0)	306°6 264°6 +21°4 +4°7	124 31	1180 173		569c 190 156 158
243°564 G Aug. 31	9564 9565	.315 .541 .884 .929 .970	325°3 92°8 41°0 127°7 115°8 (+21°0)	308°1 264°4 (297°1)	+22°0 +4°6 (+7°2)	220 34 (254)	1159 184 (1343)	106 186 79 (371)	248°441 G	9564 9565 9566	.946 .949 .526 .582 .938	304°1 289°7 267°2 186°3 68°8 (+22°2)	305°4 264°3 236°7 (232°6)	+20°9 +4°7 -28°0 (+7°2)	142 25 1 (168)	837 160 2 (999)	88 676c 270 (1034)
244°575 G Sept. 1	9564 949b 9565	.863 .455 .491 .334 .864 .935	234°7 304°9 358°3 96°9 133°5 120°9 (+21°3)	307°2 284°7 264°4 (283°7)	+21°7 +36°4 +4°5 (+7°2)	222 2 32 (256)	1220 5 180 (1405)	66 253 171 (490)	249°428 G	9564 9565 9566	.698 .985 .708 .636 .847 .911	191°5 290°0 269°4 208°0 68°4 57°1 (+22°4)	301°5 264°7 239°1 (219°6)	+21°0 +4°7 -27°2 (+7°2)	52 31 4 (87)	381 173 14 (568)	140 371c 195 114 1820

Group 9564. Aug. 28-Sept. 6. A very large group of the "stream" type, developing with extreme rapidity from two small spots or close clusters of spots photographed on Aug. 28. Both the leading and following spots are very large and somewhat composite in character; the leader becomes increasingly unstable, and has broken up into several components by Sept. 4. A cluster of small spots is prominent on Aug. 30, and, although this practically disappears, a chain of spots is formed later in its place from disintegrated portions of the two large spots.

Group 9565. Aug. 28-Sept. 9. Return of Group 9558, third apparition. A stable regular spot.

Group 9566. Sept. 5-10. A small stream of unimportant spots, of which only the leader is seen on Sept. 9.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.																	
G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 250°233		°	°	°					1924. 255°326		°	°	°				
		·987	292°0					52			·965	242°1					115
		·809	292°6					62			·908	222°3					163
		·711	201°8					127			·832	241°7					154
D	9565	·829	270°8	265°1	+ 4°7	27	158	133f		9567	·518	55°7	114°1	+23°3	61	328	
	9566	·711	218°6	238°8	-27°3	13	50	131c	C		·833	138°2					95
		·753	66°3					144			·888	78°0					220
Sept. 7		·847	56°6					125			·895	59°6					123
			(+22°6)	(209°0)	(+ 7°3)	(40)	(208)	(774)	Sept. 12		·951	69°3					238
												(+23°7)	(141°7)	(+ 7°2)	(61)	(328)	(1108)
251°382		·949	311°2					41			·961	247°4					
		·922	291°9					81		256°422	·348	37°7	114°0	+23°0	60	331	74
G	9565	·797	212°7					103		G	·741	79°1					144
	9566	·945	272°3	264°8	+ 4°5	29	171	277f			·849	68°3					135
Sept. 8		·817	228°6	237°4	-27°5	9	41	243c	Sept. 13			(+23°9)	(127°3)	(+ 7°2)	(60)	(331)	(353)
			(+22°9)	(193°8)	(+ 7°3)	(38)	(212)	(745)									
252°437		·974	292°7					171			·264	3°2	113°7	+22°4	42	225	
		·901	285°2					36		257°378							
		·874	221°1					166	G	Sept. 14		(+24°0)	(114°6)	(+ 7°2)	(42)	(225)	(0)
G		·829	321°3					164									
		·782	228°5					185									
	9565	·996	273°7	265°1	+ 4°4	11	250	155f			·824	294°4					
Sept. 9	9566	·937	238°5	242°6	-26°1	6	21	377f		9567	·361	317°9	114°8	+22°4	33	238	98
		·934	64°9					94			·984	66°2					58
			(+23°1)	(179°9)	(+ 7°2)	(17)	(271)	(1348)	Sept. 15			(+24°2)	(99°7)	(+ 7°2)	(33)	(238)	(156)
253°361		·969	285°6					44			·922	292°9					
		·933	225°9					212		259°377	·514	301°8	116°3	+22°1	13	97	241
G	9566	·860	234°7					102		G	·937	66°1					182
	9567	·966	239°8	236°7	-26°7	0	21	407f				(+24°4)	(88°3)	(+ 7°2)	(13)	(97)	(423)
Sept. 10		·808	67°1	114°2	+22°7	17	81	81c	Sept. 16								
		·964	129°4					67									
			(+23°3)	(167°7)	(+ 7°2)	(17)	(102)	(913)	260°340		·961	291°9					147
254°412		·978	229°9					110	C	9567	·686	294°5	117°6	+21°8	21	124	
		·939	237°5					101			·871	64°3					239
		·924	297°4					36	Sept. 17			(+24°5)	(75°5)	(+ 7°2)	(21)	(124)	(386)
G	9567	·776	239°2					141									
		·677	62°3	113°0	+23°8	39	277										
		·902	134°4					77			·836	291°7	119°2	+22°0	16	88	349f
		·948	61°1					73	261°329	9568	·947	117°7	356°8	-23°3	3	6	113s
Sept. 11		·967	76°9					257	C	Sept. 18		(+24°7)	(62°5)	(+ 7°1)	(19)	(94)	(462)
			(+23°5)	(153°8)	(+ 7°2)	(39)	(277)	(795)									

Group 9567. Sept. 10-19. A group of the stream type, developing from two spot centres seen on Sept. 10 in a position lightly marked by faculae on the previous day. A quasi-regular spot has appeared as the leader by Sept. 12, after which the following members decrease. The axis of the group is considerably inclined to the sun's equator.

Group 9568. Sept. 18-27. Two small spots, appearing from a compact mass of faculae at the sun's south-east limb. These fail to develop, but small variable spots or clusters of spots continue to mark their place at the two extremities of the disturbance which lengthens out considerably as shown by a comparison of the faculae on Sept. 18 and 27.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.
1924. 262.321 C Sept. 19	9567 9568	.933 .866 .968	291.0 123.3 58.4 (+24.8)	119.2 357.1 (49.4)	+22.1 -24.1 (+ 7.1)	6 27 (33)	31 107 (138)	400f 100c 206 (706)	1924. 267.393 G Sept. 24	9569 9568 9570	.950 .579 .565 .975 .700 .829 .907	295.6 303.7 200.3 85.5 63.3 67.3 78.5 (+25.5)	14.3 14.3 264.8 + 6.0 (342.4)	+24.7 -25.0 + 6.0 (+ 7.0)	4 26 20 (50)	11 145 183 (339)	131 107c 335 240 67 (880)
263.336 C Sept. 20	9569 9568	.958 .938 .451 .78 .927 .985	294.0 226.2 47.2 130.8 52.2 66.8 (+25.0)	14.8 357.2 (36.0)	+24.4 -24.1 (+ 7.1)	3 18 (21)	14 118 (132)	378 34 142c 102 513 (1169)	268.366 C Sept. 25	9569 9568 9571 9570	.706 .649 .256 .901	300.9 216.5 335.6 86.3 (+25.6)	12.0 354.7 336.0 265.1 (329.6)	+26.4 -25.1 +20.2 + 6.4 (+ 6.9)	0 19 2 29 (50)	6 87 11 137 (241)	194nf (194)
264.380 G Sept. 21	9569 9568	.814 .207 .656 .944	283.5 10.4 142.5 68.1 (+25.1)	18.9 356.2 (22.2)	+24.0 -24.9 (+ 7.1)	0 37 (37)	5 136 (141)	123 891 (1014)	269.348 C Sept. 26	9568 9570	.837 .757 .785 .976	295.7 228.1 87.4 120.1 (+25.7)	354.9 264.7 (316.6)	-24.9 + 6.3 (+ 6.9)	11 20 (31)	44 140 (184)	149 325c 143nf 115 (732)
265.414 G Sept. 22	9569 9568	.933 .924 .800 .337 .568 .878	299.1 281.1 292.9 330.3 159.8 66.6 (+25.3)	19.1 356.1 (8.6)	+23.8 -25.3 (+ 7.0)	0 51 (51)	10 252 (262)	129 147 349 1366 (1991)	270.420 G Sept. 27	9568 9570 9570a	.940 .939 .853 .608 .955 .922 .942 .973	350.2 294.4 232.2 88.8 61.5 124.4 1.3 121.4 (+25.8)	351.6 265.0 228.8 + 6.1 +29.2 (302.5)	-27.1 + 6.1 +29.2 (+ 6.8)	0 14 2 (16)	6 92 13 (111)	68 167 566nf 130f 253 79 155 (1418)
266.648 G Sept. 23	9568	.926 .537 .760 .911	292.0 185.2 65.0 70.8 (+25.4)	355.4 (352.3)	-25.2 (+ 7.0)	31 (31)	233 (233)	183 788 137 (1108)	271.430 G Sept. 28	9571 9570b 9572 9570 9573	.941 .723 .287 .244 .404 .966 .846 .900 .942 .944	238.9 291.7 314.2 359.3 89.5 68.7 130.8 60.2 125.2 103.8 (+25.9)	334.7 301.6 289.4 265.3 212.8 +22.3 (289.2)	+20.3 +18.1 +20.8 + 6.4 +22.3 (+ 6.8)	3 0 2 30 46 (81)	13 2 15 153 257 (440)	475 336f 139 107 122 42 (1221)

Group 9569. Sept. 20-25. Intermittent. A small disturbed area containing two or three ephemeral spots; none are seen on Sept. 23.

Group 9570. Sept. 24-Oct. 4. Return of Group 9565; fourth and last apparition. A small regular spot diminishing appreciably after Sept. 29. After Sept. 26, small unstable spots appear in close proximity following the spot, and one, which is rather more persistent, is seen some distance *np* it from Sept. 28-Oct. 1. The region is represented but sparsely by faculae at the west limb.

Group 9571. Sept. 25-30. Intermittent. A pair of very small spots on Sept. 25. On Sept. 28-30 a few small spots in a short stream.

Group 9572. Sept. 28-30. A slight, short-lived disturbance shown by two or three very small unstable spots; no representative faculae is seen at the west limb.

Group 9573. Sept. 28-Oct. 10. A stable regular spot, slowly diminishing with two distant followers on Oct. 2 and 3.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.
1924. 272.420		°89	240.8	°	°			256	1924. 276.452		°43	294.7	°	°			229
	9571	°86	289.2	336.7	+20.0	9	52	180c		9570	°63	273.6	262.5	+7.4	12	46	
	9572	°33	323.6	288.6	+22.4	2	4		G	9573	°38	33.4	211.3	+22.7	36	20c	
	9570	°19	92.8	264.7	+6.1	24	150			9574	°76	61.5	174.9	+25.8	16	85	338f
G	9573	°89	68.2	212.7	+22.4	29	229	439f		9575	°98	119.1	146.8	-27.3	28	252	161c
		°75	139.0					158	Oct. 3			(+20.2)	(222.9)	(+6.6)	(92)	(583)	(728)
		°76	56.7					111									
		°84	131.9					115									
		°92	121.9					176									
		°93	134.4					186									
Sept. 29		(+26.0)	(276.1)	(+6.8)		(64)	(435)	(1621)	277.327		°97	295.9					270
										9570	°78	273.9	262.8	+7.2	2	22	70c
										9573	°84	359.5	211.6	+23.0	38	194	
									C	950e	°42	78.8	186.5	+10.6	1	4	
										9574	°64	56.7	174.8	+25.9	17	73	268f
										9575	°94	121.3	140.3	-28.5	55	487	781c
273.425		°80	297.5					267			°88	65.5					92
	9571	°97	288.0	340.1	+19.0	2	14	202f	Oct. 4			(+26.3)	(211.4)	(+6.5)	(113)	(780)	(1481)
	9572	°41	309.5	282.8	+21.4	4	18										
	9570	°03	259.9	264.8	+6.4	14	52										
G	9573	°78	66.2	212.2	+22.7	28	192	312f									
	950c	°94	81.6	191.7	+10.2	0	7	87p	278.510		°92	275.6					19c
		°78	138.4					139			°06	284.9					128
		°89	125.1					88			°03	224.3					181
Sept. 30		°91	134.9					141	C	9573	°38	320.0	211.2	+23.2	32	189	
		(+26.1)	(262.8)	(+6.7)		(48)	(283)	(1236)		9574	°48	43.3	174.2	+26.4	12	49	
										9575	°91	125.5	137.8	-28.5	63	513	493c
											°97	65.9					111
274.362		°98	291.9					79	Oct. 5			(+26.3)	(195.7)	(+6.4)	(107)	(751)	(1103)
		°87	295.7					293									
		°86	309.2					122	279.413		°98	277.0					169
		°75	296.1					141			°97	285.9					98
C	9570	°24	270.7	264.7	+6.6	9	61			950f	°89	231.9					213
	9573	°64	62.5	212.1	+22.7	38	217	164f			°82	296.2	238.3	+25.1	0	3	45p
	9574	°98	65.3	176.2	+25.5	19	127	369f	G	9573	°51	305.8	210.7	+23.2	34	186	
		°76	131.1					115		9574	°36	24.0	174.2	+26.0	5	18	
Oct. 1		(+26.1)	(250.5)	(+6.7)		(66)	(405)	(1283)		9575	°84	130.2	136.5	-28.7	86	502	798c
									Oct. 6		°91	63.9					317
												(+26.4)	(183.8)	(+6.4)	(125)	(709)	(1640)
275.334		°94	297.0					403									
		°97	308.4					116	280.429		°93	293.6					49
		°86	293.8					471			°90	234.5					159
C	950d	°85	302.0	295.1	+30.6	9	21	106c		9573	°67	298.4	210.3	+23.4	33	176	
	9570	°42	272.9	262.8	+7.2	13	56		G	9574	°34	353.4	172.9	+26.4	4	23	
	9573	°50	55.2	211.0	+22.8	51	244			9575	°74	138.4	136.1	-28.7	67	439	599c
	9574	°86	64.4	175.5	+25.7	15	110	440f			°85	63.8					181
		°92	131.8					83			°95	85.6					36
Oct. 2		(+26.2)	(237.7)	(+6.6)		(88)	(431)	(1619)	Oct. 7			(+26.4)	(170.4)	(+6.3)	(104)	(638)	(1024)

Group 9574. Oct. 1-8. A regular spot, diminishing to a very small marking before disappearing after Oct. 8. There is a small distant follower on Oct. 5 and a few close ones on Oct. 7 and 8. The group evidently represents the last phases of a stream which completed its first phases on the invisible hemisphere.

Group 9575. Oct. 3-15. A stream of roughly normal type, but of remarkable length, the greatest distance between the leading and following spots being 17°. The group is a few days old when first seen at the sun's east limb. The leader appears throughout as a small contracting regular spot; the last definite trace of the follower is visible on Oct. 11, although one or two of the small spots, which have hitherto preceded it, continue until Oct. 14.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Facula.
1924. 281.627		.901	235.2	°	°			125	1924. 288.368		.989	241.9	142.9	-26.6	13	79	608f
	9573	.832	204.0	210.3	+23.4	24	187	207f		9575	.869	65.9	5.9	+23.7	117	572	374c
	9574	.441	320.7	172.6	+25.9	3	11		C		.815	122.9					94
G	9575	.627	153.1	135.9	-27.9	73	434	157f			.958	119.4	(+26.3)	(65.7)	(+5.8)	(130)	(651)
		.777	58.6					130	Oct. 15								150
		.943	74.7					138									(1226)
Oct. 8			(+26.4)	(154.6)	(+ 6.3)	(100)	(632)	(757)									
									289.339		.967	235.3					575
282.432		.942	238.0					96			.926	291.7					106
		.910	221.6					80	C	9576	.807	301.9					132
G	9573	.913	293.0	210.1	+23.4	21	160	274f			.745	64.3	6.4	+22.7	95	562	329c
	9575	.579	167.7	136.0	-28.2	50	261				.901	123.9					253
Oct. 9		.924	73.2					139	Oct. 16		.958	68.0	(+26.3)	(52.9)	(+ 5.7)	(95)	(562)
			(+26.4)	(144.0)	(+ 6.2)	(71)	(421)	(589)									(1478)
									290.339		.979	235.4					91
283.405	9573	.974	292.9	209.2	+23.7	11	126	287f			.880	298.8					147
G	9575	.568	190.4	137.8	-27.7	36	180			9576	.594	58.8	6.4	+22.6	82	559	
		.922	64.6					91	C		.846	130.2					303
Oct. 10			(+26.4)	(131.2)	(+ 6.1)	(47)	(306)	(378)			.979	67.2					274
									Oct. 17		.982	67.8	(+26.2)	(39.7)	(+ 5.6)	(82)	(559)
																	(900)
284.347		.775	301.0					198									
C	9575	.622	205.8	136.5	-28.1	27	221				.953	300.2					161
Oct. 11		.853	62.8					114	291.405		.430	45.6	6.2	+22.7	84	553	
			(+26.4)	(118.7)	(+ 6.1)	(27)	(221)	(312)	G	9576	.790	137.6					289
											.946	63.6	(+26.2)	(25.6)	(+ 5.5)	(84)	(553)
285.369		.892	298.6					240	Oct. 18								593
C	9575	.728	221.1	138.0	-28.2	34	206	244c									(1043)
Oct. 12			(+26.4)	(105.3)	(+ 6.0)	(34)	(206)	(484)									
									292.383	9576	.317	19.5	6.1	+22.7	76	523	
286.447		.961	298.3					274	C		.891	61.9					392
G	9575	.865	233.7	142.3	-27.1	18	117	827c					(+26.1)	(12.7)	(+ 5.5)	(76)	(523)
	9576	.989	67.8	8.2	+22.7	39	344	241c	Oct. 19								392
Oct. 13		.972	113.6					96									(392)
			(+26.4)	(91.0)	(+ 5.9)	(57)	(461)	(1438)									
									293.352		.962	284.6					86
287.467		.937	292.8					68			.876	293.7					240
		.937	250.1					56			.314	344.2	5.3	+22.8	88	556	
G	9575	.943	238.7	142.1	-26.9	25	100	1067c	C	9576	.830	56.1					150
	9576	.948	66.8	5.6	+23.8	73	505	794c			.865	68.0					274
Oct. 14		.886	115.2					159	Oct. 20		.966	60.0	(+26.0)	(0.0)	(+ 5.4)	(88)	(556)
			(+26.4)	(77.6)	(+ 5.9)	(98)	(605)	(2144)									(936)

Group 9576. Oct. 13-26. Revival near Group 9569 of the previous rotation. A very large regular spot, showing minor changes both of umbra and penumbra. A following spot seen at the east limb divides into two by Oct. 16, and so disappears, but a number of very small markings are evidence of continued activity in the faculae following the leader.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 294.319			°	°					1924. 299.357			°	°				
		.955	8.2					81			.968	242.5					127
		.947	293.8					125			.911	229.8					181
	951a	.867	298.4	45.9	+27.1	3	13	83c		9576	.992	292.6	4.8	+23.0	42	416	829nf
	9576	.417	317.5	4.9	+22.9	85	431		C	9578	.309	39.0	266.4	+21.3	41	168	
		.754	50.6					308		9579	.949	69.0	209.0	+21.4	16	75	234mf
		.813	66.6					184			.869	130.6					108
		.921	58.2					246	Oct. 26			(+25.5)	(280.8)	(+ 4.9)	(99)	(659)	(1479)
		.932	16.5					95									
		.981	79.6					96									
Oct. 21			(+26.0)	(347.2)	(+ 5.3)	(88)	(444)	(1218)									
									300.393		.805	300.5					99
									G	9578	.291	2.6	266.3	+21.6	50	201	
									Oct. 27	9579	.858	68.3	208.7	+21.0	12	62	136f
												(+25.3)	(267.1)	(+ 4.8)	(62)	(263)	(235)
295.620	9576	.615	301.1	4.7	+22.7	62	463										
G		.798	54.4					126									
Oct. 22			(+25.9)	(330.0)	(+ 5.2)	(62)	(463)	(126)									
									301.516		.880	299.2					314
									G	9578	.765	314.7					216
									Oct. 28	9579	.715	320.6	267.3	+21.4	36	168	
296.438	9577	.806	295.8	11.5	+23.7	4	31	55c									
G	9576	.735	296.7	4.5	+22.8	75	450										
	951b	.956	67.9	245.9	+22.6	0	7	207f									
Oct. 23			(+25.8)	(319.3)	(+ 5.1)	(79)	(488)	(262)									
									302.323		.937	293.8					220
									C	9578	.936	359.3					91
										9579	.843	307.0					178
297.509		.966	245.1					93			.507	306.3	267.6	+21.5	26	116	
		.837	234.5					207			.595	60.1	208.3	+21.1	7	27	
		.771	218.3					126			.888	67.9					127
	9577	.931	293.8	13.6	+24.0	16	42	161c	Oct. 29		.960	60.3					143
	9576	.868	293.9	4.5	+23.1	98	438	432mf				(+25.1)	(241.7)	(+ 4.6)	(33)	(143)	(759)
		.894	66.1					185									
		.960	121.7					86									
Oct. 24			(+25.7)	(305.1)	(+ 5.0)	(114)	(480)	(1290)									
									303.368		.933	304.8					229
									C	9578	.916	291.9					218
										9579	.673	297.0	267.8	+21.2	16	104	
											.427	48.1	208.1	+20.8	4	19	
298.322		.916	239.0					219			.901	135.0					62
		.846	226.5					176	Oct. 30		.935	57.3					246
		.984	293.4	15.0	+23.9	0	14	130f				(+24.9)	(227.9)	(+ 4.5)	(20)	(123)	(755)
	9577	.937	292.8	3.9	+23.0	62	402	566mf									
	9578	.535	56.2	266.0	+21.5	7	29										
	9579	.995	68.6	209.2	+21.7	0	134	102p	304.549		.960	295.8					67
		.789	63.7					122			.902	309.3					161
		.931	126.6					167	C	9578	.845	291.7	269.1	+20.5	19	74	259mf
		.966	59.9					97	9580	.958	119.3	143.6	-26.4	2	28	259c	
Oct. 25			(+25.6)	(294.4)	(+ 4.9)	(69)	(579)	(1579)	Oct. 31		.801	53.9					152
												(+24.7)	(212.3)	(+ 4.3)	(21)	(102)	(898)

Group 9577. Oct. 23-25. A very small group forming in front of Group 9576.

Group 9578. Oct. 25-Nov. 2. A group of the stream type, arising from two close pairs of tiny spots seen on Oct. 25. The rapid separation in longitude of the two spot centres is very marked.

Group 9579. Oct. 25-30. Return of Group 9573. A small regular spot, disappearing suddenly.

Group 9580. Oct. 31-Nov. 1. Revival of Group 9575. A single small spot.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbra.	Whole Spots.	Faculae.
1924. 305.411		.917	280.6	°	°			79	1924. 311.330		.954	296.3	°	°			228
		.909	306.3					140	C	951e	.292	30.3	114.0	+18.0	I	II	
C	9578	.915	290.8	266.8	+20.8	10	63	3270	Nov. 7			(+23.4)	(122.9)	(+3.6)	(I)	(II)	(228)
	9580	.898	122.2	143.1	-26.3	0	12	1810									
		.957	64.8					73									
Nov. 1		.957	122.5					357	312.396		.832	308.0					96
			(+24.6)	(200.9)	(+4.3)	(10)	(75)	(1157)	C		.686	327.5					104
									Nov. 8			(+23.2)	(108.8)	(+3.5)	(0)	(0)	(200)
306.415	9578	.985	290.2	268.4	+20.6	6	48	304 ^{nf}	313.406		.907	304.4					89
	951c	.735	231.8	226.7	-23.7	2	10		G		.800	234.0					169
C		.796	128.6					110			.994	67.5					110
		.906	127.2					239	Nov. 9			(+23.0)	(95.5)	(+3.4)	(0)	(0)	(368)
		.962	73.8					261									
Nov. 2		.966	123.0					287									
			(+24.4)	(187.7)	(+4.2)	(8)	(58)	(1201)	314.331		.896	239.1					161
									C		.822	307.1					61
307.413		.992	293.9					145			.760	223.5					330
		.912	296.0					36			.946	65.7					211
G		.855	238.2					49	Nov. 10		.985	66.5					135
		.792	132.5					233				(+22.7)	(83.3)	(+3.3)	(0)	(0)	(898)
		.889	71.8					147									
Nov. 3		.912	126.0					196	315.403		.961	242.4					172
			(+24.2)	(174.5)	(+4.1)	(0)	(0)	(806)	G	9581	.879	230.1	12.1	+21.4	8	24	296
											.853	66.7					143 ⁿ
308.472		.936	242.4					174			.930	114.3					65
		.722	141.1					225	Nov. 11		.946	63.8					302
G		.762	69.7					142				(+22.5)	(69.2)	(+3.2)	(8)	(24)	(978)
Nov. 4		.864	133.2					303									
			(+24.0)	(160.6)	(+3.9)	(0)	(0)	(904)	316.255		.904	232.1					339
											.831	290.9					154
309.359		.988	245.4					170	D	951f	.830	218.0					149
		.861	293.6					116		9581	.638	312.4	90.1	+28.0	I	5	
C		.776	304.2					135			.743	63.1	12.7	+21.8	8	30	1360
	951d	.472	320.4	168.2	+24.8	I	4				.882	63.4					499
Nov. 5		.810	140.0					300	Nov. 12		.933	119.7					96
			(+23.8)	(148.9)	(+3.8)	(1)	(4)	(721)				(+22.3)	(58.0)	(+3.1)	(9)	(35)	(1373)
310.398		.950	292.3					93	317.447		.940	290.4					139
G		.872	300.2					98	C		.938	233.8					566
Nov. 6		.777	147.8					229			.823	308.6					150
			(+23.6)	(135.2)	(+3.7)	(0)	(0)	(420)	Nov. 13		.782	56.0					266
											.931	63.8					130
												(+22.0)	(42.2)	(+2.9)	(0)	(0)	(1251)

Group 9581. Nov. 11-16. Revival of Group 9577. A small stream not seen on Nov. 13. Only the rear spot remains on Nov. 16.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 318-310		°979 °961 °933	288.9 232.5 218.3	°	°			65 237 81	1924. 323-343		°993 °692 °507 °930	297.1 309.5 57.1 65.2 (+20.3)	° 1.5 298.0 257.5 (324.5)	° +27.8 +17.8 +23.7 (+2.2)	7 58 90 87 (184)	58 444 778 (1280)	627 1916 629c (1447)
C	9581 9582	°461 °790 °967	46.3 60.5 (+21.7)	10.1 341.9 (30.9)	+21.1 +24.7 (+2.8)	16 1 (17)	63 6 (69)	48c 77 (508)	C Nov. 19	9583 9584 9585	°507 °57.1 (+20.3)	298.0 257.5 (324.5)	+17.8 +23.7 (+2.2)	90 87 (184)	444 778 (1280)	629c (1447)	
Nov. 14																	
319-316		°892 °341 °933 °985 °859 °924	296.3 20.5 27.1 72.5 133.2 59.3 (+21.5)	10.3 4.0 297.4 (17.6)	+21.3 +26.9 +17.7 (+2.7)	11 6 62 (79)	29 33 555 (617)	158 255c 109 165 (687)	324-327 C Nov. 20	9583 9584 9585	°874 °814 °355 °853 °987	293.2 301.8 40.1 62.2 (+20.0)	° 2.2 297.8 255.7 (311.6)	+26.7 +17.8 +24.6 (+2.1)	2 76 114 (192)	15 492 770 (1277)	212 335c 605c 130 (1282)
C.	9581 9583 9584	°341 °463 °985 °859 °924	20.5 27.1 72.5 133.2 59.3 (+21.5)	10.3 4.0 297.4 (17.6)	+21.3 +26.9 +17.7 (+2.7)	11 6 62 (79)	29 33 555 (617)	158 255c 109 165 (687)	Nov. 20								
Nov. 15																	
320-608	9581 9583 9584	°353 °419 °898 °852 °956	340.8 352.3 71.4 57.1 52.7 (+21.1)	7.8 4.2 297.5 (0.6)	+22.0 +27.0 +17.8 (+2.6)	1 7 53 (61)	16 88 565 (669)	320c 143 118 (581)	Nov. 21								
C																	
Nov. 16																	
321-424	9583 952a 9582 952b 9584	°913 °470 °450 °381 °760 °811 °940 °993	295.9 333.9 1.7 15.1 57.3 69.7 50.3 68.9 (+20.9)	3.2 +27.3 +29.1 343.6 304.7 297.0 (349.8)	+27.3 +29.1 +24.0 +25.9 +17.8 (+2.5)	26 1 1 1 2 121 (151)	144 3 5 7 250c 132 130 (684)	129 92c 250c 132 130 (733)	Nov. 22								
G																	
Nov. 17																	
322-321	9583 9584 9585	°964 °575 °676 °984 °877 °982	182.4 318.2 66.2 66.2 48.1 169.4 (+20.6)	3.5 297.7 258.6 (338.0)	+27.5 +17.8 +23.8 (+2.4)	11 90 63 (164)	77 511 504 (1092)	17 256c 835c 170 28 (1306)	Nov. 23								
C																	
Nov. 18																	
328-496	9584 9585 952c 952d 952e	°972 °933 °664 °399 °357 °590 °685 °787	299.7 233.6 296.4 7.1 189.4 140.4 132.1 62.2 (+18.6)	295.2 253.5 260.1 232.1 222.3 (256.6)	+18.3 +24.8 -18.9 -25.4 -25.9 (+1.6)	81 81 0 0 0 (162)	636 618 3 2 3 (1262)	73 125 618 3 2 3 (302)	Nov. 24								

Group 9582. Nov. 14-23. Intermittent. A very small spot, seen only on Nov. 14, 17, and 23.

Group 9583. Nov. 15-20. A small group of stream type, composed generally of two small clusters of spots at the front and rear respectively.

Group 9584. Nov. 15-28. A large active stream of spots. At first a simple grouping of a large regular spot and a smaller double spot 7° following in longitude. Small unstable followers then appear after Nov. 17 in increasing numbers, which give the stream a complex appearance, especially on Nov. 23, when it has nearly doubled its original length. On Nov. 26, a large spot has developed near the place of the original follower and another, of a more composite character, at the rear of the stream; meanwhile, the original leader has decreased considerably.

Group 9585. Nov. 18-Dec. 1. A large and somewhat irregularly shaped spot in the following portion of an extensive area of faculae. It is preceded by a small companion suggestive of a larger spot when on the invisible hemisphere. Other small companions appear from time to time, in general preceding the chief spot. Retrograde motion in longitude is very marked.

Group 9586. Nov. 22-23. A very small spot in the preceding part of a conspicuous area of faculae. The one-day spots, 952d and 952e also occur in the same region.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924. 329.308 C Nov. 25	9584 9585	.764 .406	292.9 345.0 (+18.3)	293.5 252.5 (245.9)	+18.3 +24.4 (+1.5)	127 52 (179)	798 474 (1272)	(o)	1924. 337.493 C Dec. 3	9587	.429 .833 .916	317.8 56.0 136.3 (+15.2)	155.7 (138.0)	+18.9 (+0.5)	9 (9)	53 (53)	372 112 (484)
330.327 C Nov. 26	9584 9585	.881 .497	290.9 322.5 (+18.0)	292.8 251.8 (232.5)	+19.0 +24.4 (+1.4)	141 64 (205)	1142 321 (1463)	668c (668)	338.405 C Dec. 4	9587	.578 .765 .858	303.9 50.1 138.1 (+14.9)	156.4 (126.0)	+18.9 (+0.3)	4 (4)	16 (16)	270 179 (449)
331.527 G Nov. 27	9584 9585	.981 .651	289.2 306.7 (+17.5)	294.9 251.3 (216.7)	+18.7 +23.8 (+1.2)	132 75 (207)	1387 376 (1763)	1047c 336p (1383)	339.480 G Dec. 5	9587	.759 .913	293.8 56.1 (+14.4)	158.6 (111.9)	+17.9 (+0.2)	0 (0)	7 (7)	83 (83)
332.508 G Nov. 28	9584 9585	.991 .777 .920	290.0 300.2 119.4 (+17.2)	285.7 250.7 (203.7)	+20.0 +23.7 (+1.1)	7 56 (63)	300 389 (689)	186c 606p 149 (941)	340.500 G Dec. 6		.855	291.4 (+14.0)	(98.4)	(+0.1)	(0)	(0)	112 (112)
333.322 C Nov. 29	9585	.868 .890	297.2 122.6 (+16.9)	250.4 (193.0)	+23.9 (+1.0)	56 (56)	416 (416)	1215sp 75 (1290)	341.373 C Dec. 7	9588	.940 .824 .962	289.0 233.3 68.1 (+13.7)	14.2 (86.9)	+21.0 (0.0)	25 (25)	200 (200)	116 116 500nf (732)
334.369 C Nov. 30	9585	.773 .952 .944	234.9 294.7 120.7 (+16.5)	249.8 (179.2)	+23.7 (+0.9)	47 (47)	337 (337)	463 870c 104 (1437)	342.349 C Dec. 8	9588	.924 .503 .887	239.6 38.2 66.2 (+13.2)	54.4 14.1 (74.1)	+23.0 +20.8 (-0.2)	1 24 (25)	5 151 (156)	116 498nf (614)
335.446 G Dec. 1	9585	.888 .860 .995 .875 .915 .979	241.7 302.5 293.6 127.9 51.6 62.0 (+16.0)	248.6 (165.0)	+23.5 (+0.7)	62 (62)	244 (244)	440 83 227f 331 46 295 (1422)	343.437 G Dec. 9	9588 9589	.755 .897	61.6 58.6 (+12.8)	14.6 0.1 (59.7)	+20.8 +27.6 (-0.3)	21 7 (28)	105 25 (130)	184f 317c (501)
336.404 C Dec. 2		.947 .948	243.9 59.3 (+15.7)	(152.4)	(+0.6)	(0)	(0)	302 205 (507)	344.321 C Dec. 10	9588 9589	.853 .849 .631 .776 .805 .930	291.4 230.2 54.8 49.4 54.6 58.1 (+12.4)	14.7 +20.9 5.4 +29.9 0.6 (48.1)	+20.9 +27.5 (-0.4)	14 2 19 (35)	92 6 82 (180)	40 194 42s 112c 150 (538)

Group 9587. Dec. 3-5. A pair of spots, of which the leader remains alone on Dec. 5.

Group 9588. Dec. 7-16. Revival near the place of Group 9581. A small regular spot with double umbra, which has divided into two components on

Dec. 8-9. The leading spot remains on Dec. 15 as a small but perfectly defined umbral spot. There is a tiny distant follower on Dec. 12.

Group 9589. Dec. 9-15. A small stream *nf* Group 9588.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.			Dist.	Pos. Angle.	Long.	Lat.	Umbrae.	Whole Spots.	Faculae.
1924.			°	°	°				1924.			°	°	°			
345°329		944	288.0					95	351°315		867	296.2					359
		935	234.6					139			750	312.0					261
		771	312.8					230			478	38.0					
C	9588	485	41.0	15.0	+20.8	17	97		C	9590	532	58.8	297.6	+20.8	30	147	
	9589	684	47.0	0.7	+27.2	17	130			9592	832	63.6	287.7	+14.4	2	8	
		868	55.4					106			949	64.8					475
Dec. 11			(+12.0)	(34.8)	(-0.6)	(34)	(227)	(570)	Dec. 17		974	57.2	(+9.2)	(315.9)	(-1.3)	(32)	(155)
																	414
346°353		996	287.3					112									126
		948	237.2					130									(1635)
		804	305.1					258									
C		848	222.3					79	352°510		951	292.7					298
	9588	386	16.0	14.8	+21.0	14	52				867	306.1					351
	9589	587	35.4	358.8	+27.9	17	67				387	5.8	297.8	+21.1	29	160	
Dec. 12	9590	980	68.1	304.2	+21.3	24	135	492 ^c	G	9592	346	39.9	287.0	+13.8	7	30	
			(+11.5)	(21.3)	(-0.7)	(55)	(254)	(1071)		9593	852	60.7	246.1	+23.7	1	6	352 ^c
											921	53.3					136
347°313		934	300.7					175	Dec. 18		972	119.4	(+8.7)	(300.2)	(-1.5)	(37)	(196)
	9588	389	344.2	15.2	+21.1	10	35										(1315)
C	9589	492	16.0	0.0	+27.3	13	65										
	9590	941	67.4	300.6	+20.8	70	259	663 ^c									
		900	58.5					96									
Dec. 13			(+11.1)	(8.7)	(-0.8)	(93)	(359)	(934)	353°616		956	300.5					363
											817	306.0					132
348°468		940	223.4					132		9590	436	335.1	296.9	+21.6	24	168	
	9588	510	316.4	15.4	+20.8	13	25		C	9592	276	353.0	287.6	+14.3	1	11	341 ^f
G	9589	496	351.1	358.4	+28.3	2	40			9591	355	3.2	284.4	+19.1	4	44	
	9590	842	64.4	299.3	+20.8	42	239	1203 ^c		9593	727	54.0	245.7	+24.0	1	9	
Dec. 14			(+10.6)	(353.4)	(-0.9)	(57)	(304)	(1335)			871	43.6					122
									Dec. 19		904	124.2					86
349°341		918	299.2					125			919	115.4	(+8.2)	(285.6)	(-1.6)	(30)	(232)
	9588	649	305.3	16.3	+21.1	8	16										126
	9589	550	336.8	356.2	+29.1	1	12										(1170)
C	9590	739	60.0	298.9	+20.8	42	243	347 ^c	354°430		980	301.4					150
	9591	852	66.8	286.2	+18.9	1	3	674 ⁿ			873	301.4					98
Dec. 15		982	67.7					575		9590	512	319.0	295.9	+21.1	33	176	
			(+10.2)	(341.9)	(-1.1)	(52)	(274)	(1721)		9592	340	323.5	286.9	+14.0	1	5	
									G	9591	375	336.0	284.1	+18.3	10	25	
350°335		974	299.5					137		953a	457	340.2	284.6	+23.7	1	2	
	9588	790	298.1	16.9	+21.0	3	10	127 ^{mf}			694	47.4					272
C	9590	614	51.6	297.8	+21.3	31	193				837	116.8					169
	9591	724	62.7	286.3	+18.5	1	3	417 ⁿ			848	128.0					160
		925	66.3					563			853	46.8					56
Dec. 16		987	65.3					161			948	61.1					124
			(+9.7)	(328.8)	(-1.2)	(35)	(206)	(1405)	Dec. 20		978	107.8	(+7.8)	(274.9)	(-1.7)	(45)	(208)
																	75
																	(1104)

Group 9590. Dec. 12-23. Return of Group 9584. Two regular spots, about 0° apart in longitude. The preceding one disappears as a dot on Dec. 21, two days before the extinction of the follower. There are occasional small companions, chiefly near the follower on Dec. 19 and 20.

Group 9591. Dec. 15-22. Intermittent. One or two very small spots on Dec. 15 and 16; on Dec. 19 a double spot which breaks up into a faint cluster by Dec. 21.

Group 9592. Dec. 17-24. A few small unstable spots in the extreme southern portion of a large faculose area immediately following Group 9590, in which Groups 9591 and 953a are also contained.

Group 9593. Dec. 18-28. Intermittent. Revival of Group 9585. A single small spot in a disturbed area on each of the days, Dec. 18, 19, 24, and 28.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924.

G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.			G.M.T. (Civil.)	Group No.	MEASURES.		POSITION.		AREA.		
		Dist.	Pos. Angle.	Long.	Lat.	Umbræ.	Whole Spots.	Faculæ.			Dist.	Pos. Angle.	Long.	Lat.	Umbræ.	Whole Spots.	Faculæ.
1924. 355.380			°	°	°				1924. 360.515			°	°	°			
		.960	301.3					83			.942	292.8					556
		.643	307.7	295.4	+21.6	16	88				.904	323.2					99
	C	9592	.515	300.9	289.3	+13.7	5	18			.818	300.9					321
		9591	.492	313.9	284.3	+18.3	1	10		G	.797	317.7					105
		9594	.410	201.5	271.8	-24.1	27	155			.976	245.0	271.8	-25.0	38	274	567c
Dec. 21			(+7.3)	(262.4)	(-1.8)	(49)	(271)	(83)	Dec. 26		.986	67.4	(194.7)	(-2.5)	(38)	(274)	(1797)
												(+4.9)					
356.328		.948	296.9					98			.984	295.1					521
		.832	291.4					209			.895	298.3					375
		.682	311.9					287			.872	311.1					165
	C	9590	.764	300.2	294.8	+21.2	11	58		C	.989	248.3	265.6	-21.8	3	36	216s
		9592	.673	292.9	289.4	+13.6	6	26			.941	63.0					123
		9591	.626	304.7	282.8	+19.2	0	3			.948	70.6					155
		9594	.516	221.5	271.9	-24.4	74	432	Dec. 27			(+4.5)	(184.0)	(-2.6)	(3)	(36)	(1555)
		9595	.414	335.9	260.2	+20.2	3	15									
		9596	.499	338.5	261.6	+25.7	1	3			.955	184.7					15
Dec. 22			(+6.9)	(249.9)	(-1.9)	(95)	(537)	(1025)			.945	306.6					249
											.869	299.1					78
										G	.806	234.3					233
											.975	297.4	243.2	+25.9	0	9	370sf
357.402		.795	301.4					390			.866	61.5					533
		.912	295.8	298.1	+22.4	3	12	617s			.959	120.8					97
	C	9592	.808	288.8	287.4	+13.7	19	59	Dec. 28			(+4.0)	(169.2)	(-2.7)	(0)	(9)	(1575)
		9594	.660	233.6	271.3	-24.7	89	453									
		9595	.545	312.6	260.8	+19.6	17	68			.986	304.1					85
Dec. 23			(+6.4)	(235.7)	(-2.1)	(128)	(592)	(1128)			.906	236.2					193
											.799	121.6	107.0	-26.5	0	6	41f
										G	.730	48.1					117
											.756	61.1					299
358.421		.968	292.4					480			.906	128.7					118
		.875	297.9					427	Dec. 29			(+3.5)	(156.3)	(-2.8)	(0)	(6)	(853)
		.731	308.1					241									
	G	9592	.909	286.1	286.1	+13.6	4	21			.958	244.0					108
		9594	.785	239.6	270.4	-24.8	79	423			.945	233.7					199
		9595	.692	301.5	260.9	+19.4	0	11			.843	252.6					43
Dec. 24		9593	.532	322.8	242.7	+22.9	0	5			.891	126.8					144
			(+5.9)	(222.3)	(-2.2)	(83)	(460)	(1650)			.955	61.0					96
									Dec. 30			(+3.0)	(144.1)	(-2.9)	(0)	(0)	(590)
359.437		.989	285.0					279			.917	245.1	196.6	-24.0	1	7	79n
		.962	296.0					508			.566	23.8	116.3	+28.2	1	11	
	G	.837	296.1					407			.883	58.2					73
		.901	243.6	271.3	-24.7	60	356	394c				(+2.5)	(131.3)	(-3.0)	(2)	(18)	(152)
Dec. 25			(+5.4)	(208.9)	(-2.3)	(60)	(356)	(1588)	Dec. 31								

Group 9594. Dec. 21-27. A stream of normal type, developing with great rapidity and breaking up prematurely.

Group 9595. Dec. 22-24. A small group of stream type.

ROYAL OBSERVATORY, GREENWICH.

GENERAL CATALOGUE

OF

GROUPS OF SUN SPOTS.

FOR THE YEAR

1924.

GENERAL CATALOGUE OF GROUPS OF SUN SPOTS for the YEAR 1924.

Groups of Sun Spots, lasting for two or more days, are numbered in the *first* column in continuation of the Group-numbers given in 1923 and the previous years. Groups seen only once are not included in this Catalogue.

The *second* column gives the duration of each group in days. Intermittent Groups, *i.e.*, groups which are not seen upon the photographs of every day between their first and last appearances, are indicated by a fraction, the numerator of which represents the number of days on which they are actually observed; the denominator being the interval in days between the extreme limits of observation.

The *fourth* and *sixth* columns, headed "Longitude from Central Meridian," give, for the days on which each Group was first and last seen respectively, the mean heliographic longitude from the meridian passing through the centre of the Sun's disc at the observation; longitudes west of the centre being reckoned as positive.

The Mean Areas for Umbra and Whole Spots entered in the *seventh* and *eighth* columns are corrected for the effect of foreshortening and are expressed in millionths of the Sun's visible hemisphere.

The *ninth* and *tenth* columns give the mean heliographic position of the group in longitude and latitude respectively.

The *eleventh* column gives reference to all Groups contained in Ledgers I. and II.; for a Group in Ledger I. both its recurrent series number and its order in the series are also given.

With reference to the identification both of Recurrent and Revival Groups, it should be noted that longitudes are based on the ephemeris given in the *Nautical Almanac*, assuming a solar rotation period, constant at all latitudes. After an interval of one rotation, recurring groups will, therefore, show in general—apart from any proper motion they may have of their own—apparent drifts in longitude varying in amount according to their respective latitudes. The following table derived from the formula $\xi = 14^{\circ} \cdot 37 - 2^{\circ} \cdot 60 \sin^2 \phi$ gives the apparent drift in longitude appropriate to corresponding latitudes after an interval of 27 days.

Latitude.	Drift forwards.	Latitude.	Drift backwards.
0°	5°	20°	3°
5°	4·5	25°	7·5
10°	3	30°	12·5
15°	0·5	35°	18

GENERAL CATALOGUE of SUN SPOTS.

No. of Group.	Duration in Days.	First Seen.		Last Seen.		Mean Area Corrected for Foreshortening.		Mean Position of Group.		Reference to Ledger.	NOTES.	
		Date.	Longitude from Central Meridian.	Date.	Longitude from Central Meridian.	Umbra.	Whole Spots.	Longitude.	Latitude.			
9521		1924.	°	1924.	°			°	°			
	2	Jan. 5	+36.0	Jan. 6	+45.4	1	4	249.5	+28.4			
	2	Feb. 15	+7.0	Feb. 16	+19.3	2	4	42.4	+22.6			
	3	25	-28.3	Mar. 4	+74.9	59	320	233.6	+27.2	II.		
	4	22	+41.1	23	+51.7	3	12	320.0	-29.6			
	5	22	-21.0	24	+3.3	2	9	258.2	+18.9			
	6	2/5	Apr. 10	+2.6	Apr. 14	+58.2	1	6	33.5	+29.6		
	7	7	16	-52.1	22	+23.2	19	80	256.5	+21.8	II.	Revival of Group 9525.
	8	9	18	-38.4	26	+61.0	34	245	243.3	-28.6	II.	
9	9	19	-19.8	27	+77.6	31	188	250.8	-27.5	I. 957 (1)		
9530		May 7	-29.6	May 14	+59.5	12	68	2.1	+31.7	II.		
	1	11	-49.7	21	+82.6	52	326	290.2	-21.0	II.		
	2	10/13	-78.4	24	+74.6	5	23	246.3	-30.2	I. 957 (2)		
	3	3	-70.0	16	-44.8	2	8	231.0	-26.8		Revival of Group 9528.	
	4	11	-84.4	27	+44.4	8	38	175.7	-22.0	II.		
	5	8/11	-65.5	28	+52.3	8	30	175.8	+37.4	II.		
	6	3	-6.3	29	+23.1	4	29	124.2	+18.7			
	7	14	-84.6	June 11	+80.7	116	856	10.4	+31.2	I. 958 (1)		
	8	2/3	31	-72.6	2	-42.8	1	5	3.7	-29.4		
9	2	June 1	+10.1	2	+22.5	1	4	71.1	+2.9			
9540	2/5	7	-53.0	11	+1.4	0	2	289.8	-21.6		Revival of Group 9531.	
	1	9	-36.2	18	+75.8	20	106	269.7	+22.4	II.		
	2	7	-18.5	19	+63.0	11	51	246.9	-24.9	II.		
	3	10	-47.5	28	+70.0	13	75	138.6	+36.8	II.		
	4	6/7	+3.4	26	+76.5	.2	16	171.8	+26.8			
	5	13	-80.8	July 9	+75.2	34	209	353.6	+32.4	I. 958 (2)		
	6	11	-57.4	11	+80.3	17	84	331.4	+19.4	II.		
	7	5	-57.8	5	-8.2	14	54	327.0	+25.9			
	8	4	1	-53.6	8	-14.6	1	14	280.2	-22.0		
9	14	6	-82.2	19	+85.7	50	317	235.7	+21.8	I. 959 (1)		
9550	6	7	-58.1	12	+0.3	2	13	243.7	-27.0	II.	Revival of Group 9542.	
	1	2	-25.7	10	-14.4	1	6	254.3	-24.6			
	2	9	-29.5	17	+82.3	58	306	254.4	+5.3	I. 960 (1)		
	3	5	-67.0	24	-11.9	2	6	69.4	+19.9			
	4	3	+42.6	23	+71.8	11	43	165.4	+27.2		Revival of Group 9544.	
	5	9	-28.5	29	+71.9	11	49	90.6	+27.5	II.		
	6	13	-75.5	Aug. 6	+85.7	28	136	355.4	+34.6	II.	Revival near position of Group 9545.	
	7	6	-81.6	4	-22.8	3	16	278.0	+38.8	II.		
	8	13	-74.1	13	+84.6	49	236	261.6	+5.9	I. 960 (2)		
9	4	3	-67.5	6	-24.5	6	19	243.4	+28.1			
9560	9	3	-77.8	11	+27.3	10	43	230.4	+24.1	I. 959 (2)		
	1	4	+18.6	10	+58.2	3	15	274.2	-18.8			
	2	3	-40.8	14	+65.4	15	59	230.3	-25.4		Revival of Group 9550.	
	3	13	-80.1	27	+82.3	36	220	72.6	+15.8	II.		
	4	10	-31.2	Sept. 6	+81.9	160	958	307.4	+21.5	II.		
	5	13	-76.3	9	+85.2	33	184	264.4	+4.6	I. 960 (3)		
	6	6	+4.1	10	+69.0	6	25	238.6	-27.1	II.		
	7	10	-53.5	19	+69.8	31	182	115.6	+22.6	II.		
	8	10	-65.7	27	+49.1	22	113	355.5	-24.9	II.		
9	5/6	20	-21.2	25	+42.4	1	8	15.8	+24.7			

GENERAL CATALOGUE OF SUN SPOTS—*continued*.

No. of Group.	Duration in Days.	First Seen.		Last Seen.		Mean Area Corrected for Foreshortening.		Mean Position of Group.		Reference to Ledger.	NOTES.
		Date.	Longitude from Central Meridian.	Date.	Longitude from Central Meridian.	Umbrae.	Whole Spots.	Longitude.	Latitude.		
		1924.	°	1924.	°			°	°		
9570	11	Sept. 24	-77.6	Oct. 4	+51.4	17	99	264.3	+6.6	I. 960 (4)	
1	4/6	25	+6.4	Sept. 30	+77.3	3	15	336.9	+19.9		
2	3	28	+0.2	30	+20.0	3	12	286.9	+21.5		
3	13	28	-76.4	Oct. 10	+78.0	32	197	211.2	+23.0	I. 961 (1)	
4	8	Oct. 1	-74.3	8	+18.0	11	62	174.4	+26.0	II.	
5	13	3	-76.1	15	+77.2	46	295	138.5	-27.9	II.	
6	14	13	-82.8	26	+84.0	80	495	5.3	+23.0	II.	Revival of Group 9569.
7	3	23	+52.2	25	+80.6	7	29	13.4	+23.9		
8	9	25	-28.4	Nov. 2	+80.7	23	108	267.3	+21.2	II.	
9	6	25	-85.2	Oct. 30	-19.8	8	63	208.6	+21.2	I. 961 (2)	
9580	2	31	-68.7	Nov. 1	-57.8	1	20	143.4	-26.4		Revival near Group 9575.
1	5/6	Nov. 11	-57.1	16	+7.2	7	27	10.6	+21.5	II.	Revival of Group 9577.
2	3/10	14	-49.0	23	+73.6	0	3	343.5	+24.1		
3	6	15	-13.6	20	+50.6	10	69	3.1	+27.2	II.	
4	14	15	-80.2	28	+82.0	103	723	296.2	+18.2	I. 962 (1)	
5	14	18	-79.4	Dec. 1	+83.6	76	529	253.1	+24.2	II.	
6	2	22	-57.8	Nov. 23	-44.5	2	5	227.4	-22.9		
7	3	Dec. 3	+17.7	Dec. 5	+46.7	4	25	156.9	+18.6		
8	10	7	-72.7	16	+48.1	15	78	15.1	+20.9	II.	
9	7	9	-59.6	15	+14.3	11	60	359.3	+27.8	II.	Revival of Group 9583.
9590	12	12	-77.1	23	+62.4	30	158	297.6	+21.2	I. 962 (2)	
1	6/8	15	-55.7	22	+32.9	2	11	284.7	+18.7	II.	
2	8	17	-28.2	24	+63.8	6	22	287.7	+13.9	II.	
3	4/11	18	-54.1	28	+74.0	0	3	244.4	+24.1	II.	Revival of Group 9585.
4	7	21	+9.4	27	+81.6	61	349	271.4	-24.6	II.	
5	3	22	+10.3	24	+38.6	7	31	260.6	+19.7		

GENERAL CATALOGUE OF SUN SPOTS—*continued*.

REVIVAL GROUPS OF SUN SPOTS, 1924.

Groups of spots, noted in the preceding Catalogue as "Revivals," have been tabulated in series in the following table. The respective groups of each series are in the same heliographic position, and are seen in consecutive rotations but with definite breaks in their history between each rotation. The latter feature excludes them from being classed as "Recurrent" groups; they differ from "Intermittent" groups in their being of long period intermittency. When a "Recurrent" series forms part of a "Revival" series, a reference is made in the last column of the table. Other groups which are given in detail in Ledger II are also indicated.

Reference No. of Series.	Group No.	No. of Rotation.	Duration.	First Seen.		Last Seen.		Mean Area.	Mean Position.		Reference to Ledger.
				Date.	Longitude from C.M.	Date.	Longitude from C.M.		Longitude.	Latitude.	
1	9525	943	3	Mar. 22	-21	Mar. 24	+3	9	258	+19	II.
	9527	944	7	Apr. 16	-52	Apr. 22	+23	80	257	+22	
2	9528	944	9	Apr. 18	-38	Apr. 26	+61	245	243	-29	II.
	9533	945	3	May 14	-70	May 16	-45	8	231	-27	
3	9531	945	11	May 11	-50	May 21	+83	326	290	-21	II.
	9540	946	2/5	June 7	-53	June 11	+1	2	290	-22	
	9548	947	4	July 5	-54	July 8	-15	14	280	-22	
4	9542	946	7	June 13	-19	June 19	+63	51	247	-25	II. II.
	9550	947	6	July 7	-58	July 12	0	13	244	-27	
	9562	948	3	Aug. 12	+41	Aug. 14	+65	59	230	-25	
5	9544	946	6/7	June 20	+3	June 26	+77	16	172	+27	
	9554	947	3	July 21	+43	July 23	+72	43	165	+27	
6	9569	950	5/6	Sept. 20	-21	Sept. 25	+42	8	16	+25	II.
	9576	951	14	Oct. 13	-83	Oct. 26	+84	495	5	+23	
7	9577	951	3	Oct. 23	+52	Oct. 25	+81	29	13	+24	II.
	9581	952	5/6	Nov. 11	-57	Nov. 16	+7	27	11	+22	
8	9583	952	6	Nov. 15	-14	Nov. 20	+51	69	3	+27	II.
	9589	953	7	Dec. 9	-60	Dec. 15	+14	60	359	+28	II.
9	9585	952	14	Nov. 18	-79	Dec. 1	+84	529	253	+24	II.
	9593	953	4/11	Dec. 18	-54	Dec. 28	+74	3	244	+24	II.

ROYAL OBSERVATORY, GREENWICH.

LEDGERS

OF

GROUPS OF SUN SPOTS

FOR THE YEAR

1924.

LEDGER I.—RECURRENT GROUPS.

LEDGER I.—RECURRENT GROUPS OF SUN SPOTS for the YEAR 1924.

The Greenwich Civil Time at which the photograph was taken is expressed in the *first* column by the Day of the Year (civil reckoning) and decimal of a day, reckoned from Greenwich Mean Midnight.

The place where the photograph was taken is also indicated in the *first* column. A photograph taken at Greenwich is indicated by the letter G, and those taken at the Cape, Kodaikáhal, Dehra Dûn, by the letters C, K, and D respectively.

The Projected Area of the Umbræ and Whole Spots, given in the *second* and *third* columns, is the area as it is measured on the photograph, uncorrected for the effect of foreshortening, and expressed in millionths of the Sun's apparent disc.

The area corrected for foreshortening given in the *fourth* and *fifth* columns is expressed in millionths of the Sun's visible hemisphere.

The longitude given in the *sixth* column is based on the ephemeris given in the *Nautical Almanac*, assuming a daily sidereal motion of $14^{\circ}.18$, due to the Sun's rotation, constant at all latitudes; this corresponds to Carrington's assumed rotation period of 25.38 days.

The proper motion given in the *seventh* column is derived from the difference of longitude thus computed from the measured positions on any given day and the first day on which the group of spots or single spot is visible, after the correction for the motion appropriate to the latitude has been applied according to the formula, $\xi = 14^{\circ}.37 - 2^{\circ}.60 \sin^2 \phi$.

A *plus* sign indicates a motion forwards; a *minus* sign a motion backwards relative to the position on the first day.

The remaining columns correspond to those with similar headings in the preceding Section.

When a group is near the East or the West limb of the Sun on any particular day, and in consequence is only visible in part, the measures for that day are marked with an asterisk and are not included in taking the mean area, longitude, and latitude of the group.

LEDGER I.—RECURRENT GROUP of SUN SPOTS for the YEAR 1924.

Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbra.	Whole Spots.	Umbra.	Whole Spots.					Umbra.	Whole Spots.	Umbra.	Whole Spots.					
RECURRENT SERIES No. 957. Latitude $-28^{\circ}.8$.																	
Group 9529 in Rotation 944.																	
" 9532 " " 945.																	
Group 9529.—April 19-27. A short stream immediately preceding Group 9528.																	
A small regular spot leading the stream is the only stable component until the appearance of a similar spot at the rear on April 24.																	
109.459 G	18	36	10	21	251.0	0.0	-27.8	-19.8	153.593 G	169	1206	123	878	11.6	-0.3	+31.5	-35.6
110.460 G	17	71	9	38	251.2	+0.6	-27.5	-6.4	154.422 G	243	1361	160	892	10.9	-0.5	+31.6	-25.5
111.365 C	38	243	21	131	250.1	-0.1	-27.1	+4.5	155.391 C	206	1685	123	1013	10.9	0.0	+31.4	-12.5
112.449 G	57	386	32	220	250.4	+0.6	-26.8	+19.1	156.412 G	220	1827	130	1076	9.6	-0.8	+31.3	-0.3
113.510 C	52	228	34	147	250.6	+1.3	-27.1	+33.3	157.370 G	225	1837	135	1101	8.9	-1.0	+31.2	+11.7
114.353 C	70	447	53	334	250.4	+1.4	-27.4	+44.2	158.439 C	227	1520	148	984	8.1	-1.2	+31.3	+25.0
115.479 G	53	323	54	331	250.5	+2.0	-27.8	+59.2	159.303 G	154	1001	111	728	8.9	+0.2	+30.7	+37.2
116.328 C	22	171	36	282	252.3	+4.1	-28.3	+72.2	160.375 G	102	682	94	630	8.9	+0.6	+30.6	+51.4
117.339 G	8	59	18	133	244.3	..	-28.2	+77.6	161.364 G	57	375	77	506	9.1	+1.4	+30.7	+64.7
									162.585 G	20	159	70	544	8.9	+1.8	+30.9	+80.7
Means ..	..	..	31	188	250.8	..	-27.5	..	Means ..	..	..	116	856	10.4	..	+31.2	..
Group 9532.—May 12-24. Intermittent. A small regular spot diminishing to a dot on May 18. Nothing is then visible until May 22, when a few small spots make their appearance in the faculae marking the disturbed region.																	
132.382 G	2	13	5	33	249.4	+7.9	-29.9	-78.4	150.378 G	50	275	91	519	18.3	0.0	+30.7	-71.5
133.627 G	15	54	18	64	248.5	+7.5	-29.7	-62.9	151.450 C	55	446	60	486	18.1	+0.4	+30.3	-57.5
134.352 G	10	52	9	48	248.1	+7.4	-29.8	-53.7	152.446 C	68	520	56	426	18.0	+0.8	+30.5	-44.4
135.491 C	9	37	7	27	247.0	+6.8	-29.7	-39.7	153.593 G	84	604	56	405	17.2	+0.6	+30.4	-30.0
136.348 C	7	15	4	10	246.5	+6.6	-29.8	-28.9	154.422 G	130	753	81	467	16.1	0.0	+30.6	-20.2
137.354 G	6	13	4	8	246.1	+6.7	-29.7	-16.0	155.391 C	135	909	78	527	16.0	+0.4	+30.2	-7.4
138.475 G	1	8	1	4	245.4	+6.4	-29.8	-1.9	156.412 G	129	981	75	569	14.4	-0.7	+30.2	+4.5
139.351 G	0	0	0	0	..	..	..	..	157.370 G	124	924	74	554	13.7	-0.9	+29.9	+16.5
140.666 G	0	0	0	0	..	..	..	..	158.439 C	122	809	81	534	12.4	-1.6	+30.3	+29.3
141.353 G	0	0	0	0	..	..	..	..	159.303 G	80	647	60	485	11.8	-1.6	+30.0	+40.1
142.360 G	0	3	0	3	244.6	+7.2	-31.9	+48.7	160.375 G	68	490	65	470	10.9	-2.1	+30.2	+53.4
143.364 G	13	50	16	59	244.2	+7.2	-30.2	+61.6	161.364 G	49	322	68	444	10.0	-2.4	+30.3	+65.6
144.411 G	3	18	6	38	243.3	+6.8	-31.0	+74.6	162.585 G	18	134	65	484	9.4	-2.4	+30.8	+81.2
Means ..	..	..	5	23	246.3	..	-30.2	..	Cluster b.								
No. 958. Latitude $+31^{\circ}.8$.																	
Group 9537 in Rotation 945.																	
" 9545 " " 946.																	
Group 9537.—May 29-June 11. A very large stream, 14° of longitude in length, of which the leader, <i>a</i> , is the predominating spot. The other components are mostly unstable aggregations of indefinite markings, showing a tendency on some days to condense to definite spots. The rearmost cluster is represented by <i>b</i> .																	
149.364 G	10	60	74	442	18.6	..	+30.9	*-84.6	153.593 G	33	207	27	172	3.3	0.0	+32.3	-43.9
150.378 G	61	373	127	969	13.6	0.0	+31.7	-76.2	154.422 G	36	242	26	174	2.3	-0.6	+32.5	-34.0
151.450 C	84	724	108	934	13.1	+0.1	+31.4	-62.5	155.391 C	28	242	18	155	1.9	-0.4	+32.6	-21.5
152.446 C	117	955	106	868	13.2	+0.7	+31.5	-49.2	156.412 G	36	245	22	147	0.0	-1.8	+32.5	-9.9
									157.370 G	23	191	14	113	359.3	-2.0	+32.2	+2.1
									158.439 C	32	182	20	111	358.3	-2.4	+32.0	+15.2
									159.303 G	21	73	14	47	357.6	-2.7	+31.7	+25.9
									160.375 G	6	40	4	30	356.7	-3.0	+31.5	+39.2
Group 9545.—June 27-July 9. A pair of nearly regular spots, <i>a</i> and <i>a'</i> , about 24° apart in longitude, with occasional very small companions. The following spot shows instability from July 1-3, but it regains its normal appearance before finally disappearing as a tiny spot after July 7. The two spots which most probably represent <i>a</i> of Group 9537 partake of a common retrograde motion in longitude. The position on July 9 is that of an ephemeral companion.																	
178.367 G	16	130	50	413	358.5	-4.9	+31.5	-80.8	153.593 G	33	207	27	172	3.3	0.0	+32.3	-43.9
179.304 G	40	248	64	392	357.3	-5.6	+32.0	-69.6	154.422 G	36	242	26	174	2.3	-0.6	+32.5	-34.0
180.422 G	60	316	60	316	356.3	-6.0	+32.3	-55.8	155.391 C	28	242	18	155	1.9	-0.4	+32.6	-21.5

LEDGER I.—RECURRENT GROUPS OF SUN SPOTS for the YEAR 1924—continued.

Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbra.	Whole Spots.	Umbra.	Whole Spots.					Umbra.	Whole Spots.	Umbra.	Whole Spots.					
No. 958, Group 9545—continued.								No. 959, Group 9549—continued.									
181.421 G	49	346	39	271	355.5	-6.2	+32.5	-43.4	191.307 G	92	639	57	392	236.0	+0.2	+21.4	-32.0
182.368 G	54	334	37	226	354.4	-6.9	+32.8	-31.9	192.349 G	101	622	58	345	236.1	+0.5	+21.7	-18.1
183.478 G	45	344	28	208	353.6	-7.1	+32.7	-18.1	193.306 G	81	459	43	240	235.9	+0.5	+21.4	-5.7
184.435 G	61	330	35	191	353.2	-7.0	+32.8	-5.8	194.367 C	70	371	38	197	236.2	+1.0	+21.5	+8.7
185.497 C	49	297	29	172	351.9	-7.7	+32.6	+7.0	195.306 G	75	437	41	243	235.4	+0.4	+21.8	+20.3
186.368 G	57	248	34	149	351.3	-7.9	+32.7	+17.9	196.307 G	52	369	32	231	235.9	+1.1	+21.8	+34.0
187.402 G	31	176	20	119	352.1	-6.5	+32.9	+32.4	197.517 G	65	399	51	314	235.3	+0.7	+21.5	+49.4
188.570 G	8	47	7	39	350.6	-7.4	+32.3	+46.3	198.305 G	43	296	44	297	235.1	+0.7	+21.9	+59.7
189.308 G	1	13	1	13	349.1	-8.5	+32.2	+54.6	199.405 G	21	122	38	220	235.5	+1.3	+22.0	+74.6
190.350 G	0	10	(0)	20	355.9	..	+34.4)*	+75.2	200.374 G	0	39	0	207	233.8	-0.2	+22.4	+85.7
Means ..	..	..	34	209	353.6	..	+32.4	..	Means ..	..	..	50	317	235.7	..	+21.8	..
Spot a.								Spot a.									
179.304 G	16	103	24	151	358.5	-4.4	+31.1	-68.4	188.570 G	45	275	56	344	238.4	0.0	+22.0	-65.9
180.422 G	28	133	27	126	357.8	-4.5	+31.5	-54.3	189.308 G	59	343	55	319	238.2	0.0	+21.7	-56.3
181.421 G	22	123	17	93	356.8	-4.9	+31.8	-42.1	190.350 G	82	447	58	317	238.2	+0.2	+21.7	-42.5
182.368 G	24	133	16	88	356.0	-5.3	+31.9	-30.3	191.307 G	60	470	36	282	237.9	+0.1	+21.4	-30.1
183.478 G	23	125	14	74	355.3	-5.4	+31.9	-16.4	192.349 G	76	457	42	251	237.7	+0.1	+21.4	-16.5
184.435 G	35	147	20	84	354.5	-5.7	+31.9	-4.5	193.306 G	54	366	28	190	237.1	-0.3	+21.1	-4.5
185.497 C	24	147	14	85	353.4	-6.2	+31.8	+8.5	194.367 C	54	294	29	156	237.4	+0.2	+21.2	+9.9
186.368 G	28	115	17	69	352.8	-6.4	+31.6	+19.4	195.306 G	54	323	30	181	236.9	-0.1	+21.4	+21.8
187.402 G	15	75	10	50	351.9	-6.7	+31.7	+32.2	196.307 G	43	293	27	185	236.5	-0.3	+21.6	+34.6
188.570 G	8	36	7	30	351.2	-6.8	+32.0	+46.9	197.517 G	50	264	40	211	236.1	-0.5	+21.5	+50.2
189.308 G	1	6	1	6	350.2	-7.4	+32.3	+55.7	198.305 G	38	190	39	194	235.6	-0.8	+21.9	+60.2
									199.405 G	21	122	38	220	235.5	-0.7	+22.0	+74.6
Spot a ¹ .								Spot b.									
179.304 G	24	145	40	241	356.0	-6.9	+32.7	-70.9	188.570 G	16	110	27	183	231.8	0.0	+22.5	-72.5
180.422 G	32	183	33	190	355.0	-7.3	+32.9	-57.1	189.308 G	22	126	25	142	231.4	-0.2	+22.7	-63.1
181.421 G	26	201	21	161	354.2	-7.5	+33.0	-44.7	190.350 G	27	112	22	91	230.6	-0.8	+22.4	-50.1
182.368 G	30	192	21	132	353.0	-8.3	+33.4	-33.3	191.307 G	18	108	12	71	230.1	-1.1	+22.2	-37.9
183.478 G	19	193	12	118	352.2	-8.5	+33.2	-19.5	192.349 G	24	92	14	53	229.6	-1.4	+22.5	-24.6
184.435 G	16	133	9	77	351.9	-8.3	+33.0	-7.1	193.306 G	18	65	10	35	229.1	-1.7	+22.4	-12.5
185.497 C	19	123	11	71	350.8	-8.8	+33.0	+5.9	194.367 C	11	28	6	15	229.2	-1.4	+22.4	+1.7
186.368 G	24	106	14	64	350.5	-8.7	+33.0	+17.1	195.306 G	9	39	5	21	228.6	-1.8	+22.6	+13.5
187.402 G	11	60	7	40	349.6	-9.0	+33.1	+29.9									
188.570 G	0	11	0	9	349.2	-8.8	+33.1	+44.9									
No. 959. Latitude +22°.9.								Group 9560.—August 3-11. A small regular spot, a of Group 9549, decreasing to a tiny marking before extinction.									
Group 9549 in Rotation 947.																	
" 9560 " " 948																	
Group 9549.—July 6-19. A stream of normal type in which the leader, a, shows signs of being somewhat unstable, and the follower, b, although small, is unusually persistent.																	
187.402 G	10	62	(34	213	237.5	..	+21.8)*	-82.2	215.362 G	10	42	21	89	232.0	-0.9	+24.4	-77.8
188.570 G	61	385	83	527	236.4	0.0	+22.1	-67.9	216.387 G	11	68	13	80	231.2	-1.5	+24.7	-65.1
189.308 G	83	484	82	476	236.4	+0.2	+21.8	-58.1	217.352 G	20	80	17	67	230.9	-1.6	+24.5	-52.6
190.350 G	118	583	87	426	236.4	+0.4	+21.8	-44.3	218.482 G	21	93	14	61	230.4	-1.9	+24.1	-38.1
									219.616 G	20	80	11	46	230.3	-1.8	+24.4	-23.3
									220.366 G	15	39	8	21	229.7	-2.2	+24.3	-13.9
									221.377 G	10	35	5	18	229.4	-2.3	+24.1	-0.9
									222.417 G	2	8	1	4	228.7	-2.8	+24.1	+12.2
									223.391 G	0	5	0	3	230.9	-0.4	+22.0	+27.3
Means ..	..	..	10	43	230.4	..	+24.1	..	Means ..	..	..	10	43	230.4	..	+24.1	..

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1924—*continued*.

Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					
No. 960. Latitude +5°.6.								No. 960, Group 9558—continued.									
Group 9552 in Rotation 947. " 9558 " " 948. " 9565 " " 949. " 9570 " " 950.																	
Group 9552.—July 9–17. A large stream of normal type in low latitude, developing rapidly from a few spots seen on July 9 in a position lightly marked by faculæ at the east limb on July 6 and 7. The leader, <i>a</i> , when completely developed, is a well-defined regular spot; the follower, <i>b</i> , as usual, is composite and is very short-lived. The appearance of so large a group in equatorial latitudes within a year of the minimum is abnormal.																	
^d 190° 350 G	31	78	18	44	251.2	0.0	+ 5.3	-29.5	^a 219° 615 G	90	514	45	257	261.4	+1.0	+ 6.0	+ 7.8
191° 307 G	32	180	16	94	251.1	-0.3	+ 4.7	-16.9	220° 366 G	106	420	55	218	261.3	+0.7	+ 6.0	+17.7
192° 349 G	109	558	54	278	253.6	+2.1	+ 5.5	-0.6	221° 377 G	87	392	50	227	261.6	+0.9	+ 6.1	+31.3
193° 306 G	190	962	98	496	254.1	+2.4	+ 5.5	+12.5	222° 417 G	60	288	43	204	262.0	+1.1	+ 6.1	+45.5
194° 367 C	163	889	91	497	254.6	+2.7	+ 5.3	+27.1	223° 391 G	43	235	41	223	262.2	+1.1	+ 6.1	+58.6
195° 306 G	117	695	76	452	254.8	+2.8	+ 5.2	+39.7	224° 373 G	30	167	46	257	262.2	+1.0	+ 6.1	+71.5
196° 307 G	71	463	59	388	255.4	+3.2	+ 5.2	+53.5	225° 370 G	9	32	43	153	262.1	+0.7	+ 6.0	+84.6
197° 517 G	33	178	48	269	256.9	+4.5	+ 5.3	+71.0	Means ..	..	..	49	236	261.6	..	+ 5.9	..
198° 305 G	16	66	58	238	257.7	+5.2	+ 5.5	+82.3	Group 9565.—August 28–September 9. A stable regular spot, <i>a</i> , of Group 9552.								
Means ..	..	..	58	306	254.4	..	+ 5.3	..	240° 331 C	28	103	57	211	263.5	-0.4	+ 4.8	-76.3
Spot <i>a</i> .								241° 462 G	50	191	52	197	263.6	-0.4	+ 4.8	-61.2	
193° 306 G	109	531	57	276	256.1	0.0	+ 5.2	+14.5	242° 475 G	50	253	37	185	264.1	-0.1	+ 4.6	-47.3
194° 367 C	96	552	55	315	257.0	+0.7	+ 5.2	+29.5	243° 565 G	57	312	34	184	264.4	0.0	+ 4.6	-32.7
195° 306 G	81	466	54	312	257.0	+0.6	+ 5.0	+41.9	244° 575 G	61	339	32	180	264.4	-0.2	+ 4.5	-19.3
196° 307 G	56	359	48	309	256.6	0.0	+ 5.3	+54.7	245° 328 C	58	353	30	180	264.2	-0.5	+ 4.6	-9.6
197° 517 G	26	160	40	248	257.4	+0.6	+ 5.3	+71.5	246° 622 G	64	351	32	176	264.3	-0.6	+ 4.7	+ 7.6
198° 305 G	16	66	58	238	257.7	+0.8	+ 5.5	+82.3	247° 343 C	59	332	31	173	264.6	-0.4	+ 4.7	+17.4
Spot <i>b</i> .								248° 441 G	42	272	25	160	264.3	-0.9	+ 4.7	+31.7	
193° 306 G	81	431	41	220	251.0	0.0	+ 5.6	+ 9.4	249° 428 G	44	244	31	173	264.7	-0.7	+ 4.7	+45.1
194° 367 C	67	337	36	182	250.8	-0.4	+ 5.6	+23.3	250° 233 D	30	177	27	158	265.1	-0.4	+ 4.7	+56.1
195° 306 G	36	229	22	140	250.6	-0.7	+ 5.5	+35.5	251° 382 G	19	113	29	171	264.8	-0.9	+ 4.5	+71.0
196° 307 G	15	104	11	79	250.7	-0.8	+ 5.1	+48.8	252° 437 G	2	47	11	250	265.1	-0.8	+ 4.4	+85.2
197° 517 G	7	18	8	21	251.4	-0.3	+ 4.7	+65.5	Means ..	..	..	33	184	264.4	..	+ 4.6	..
Group 9558.—August 1–13. A stable regular spot, evidently <i>a</i> , of Group 9552, with a few tiny companions on August 7, 8, and 11.								Group 9570.—September 24–October 4. A small regular spot, <i>a</i> , of Group 9552, diminishing appreciably after September 29. After September 26, small unstable spots appear in close proximity following it, and one, which is rather more persistent, is seen some distance <i>np</i> it from September 28 to October 1. The region is represented but sparsely by faculæ at the west limb.									
213° 383 C	30	174	53	308	261.9	+2.5	+ 5.5	-74.1	267° 393 G	9	83	20	183	264.8	-3.5	+ 6.0	-77.6
214° 427 G	43	249	43	251	261.5	+1.9	+ 5.7	-60.7	268° 366 C	25	120	29	137	265.1	-3.4	+ 6.4	-64.5
215° 362 G	66	337	49	253	261.2	+1.5	+ 5.8	-48.6	269° 348 C	25	175	20	140	264.7	-3.9	+ 6.3	-51.9
216° 387 G	76	371	46	226	261.3	+1.4	+ 5.8	-35.0	270° 420 G	23	146	14	92	265.0	-3.8	+ 6.1	-37.5
217° 352 G	111	490	60	265	261.5	+1.4	+ 5.8	-22.0	271° 430 G	53	279	30	153	265.3	-3.7	+ 6.4	-23.9
218° 482 G	115	460	57	230	261.3	+1.1	+ 5.8	-7.2	272° 420 G	47	295	24	150	264.7	-4.5	+ 6.1	-11.4
								273° 425 G	27	104	14	52	264.8	-4.5	+ 6.4	+ 2.0	
								274° 362 C	17	120	9	61	264.7	-4.8	+ 6.6	+14.2	
								275° 334 C	24	101	13	56	262.8	-6.8	+ 7.2	+25.1	
								276° 452 G	18	71	12	46	262.5	-7.3	+ 7.4	+39.6	
								277° 327 C	2	28	2	22	262.8	-7.2	+ 7.2	+51.4	
								Means ..	..	..	17	99	264.3	..	+ 6.6	..	

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1924—*continued.*

Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.			
	Umbra.	Whole Spots.	Umbra.	Whole Spots.					Umbra.	Whole Spots.								
No. 961. Latitude +22° 1.								No. 962, Group 9584—continued.										
Group 9573 in Rotation 950.																		
" 9579 " " 951.																		
Group 9573.—September 28–October 10. A stable regular spot slowly diminishing, with two distant followers on October 2 and 3.																		
^a								^a										
271.430 G	24	135	46	257	212.8	0.0	+22.3	-76.4	322.321 C	132	757	90	511	297.7	+0.6	+17.8	-40.0	
272.420 G	26	208	29	229	212.7	+0.1	+22.4	-63.4	323.343 C	157	771	90	444	298.0	+1.0	+17.8	-26.5	
273.425 G	35	240	28	192	212.2	-0.2	+22.7	-50.6	324.327 C	145	922	76	492	297.8	+0.9	+17.8	-13.8	
274.362 C	59	334	38	217	212.1	-0.2	+22.7	-38.4	325.406 C	204	1365	107	711	296.7	-0.1	+18.1	-0.6	
275.334 C	88	424	51	244	211.0	-1.1	+22.8	-26.7	326.308 C	226	1434	119	762	296.8	+0.1	+18.4	+11.3	
276.452 G	67	377	36	200	211.3	-0.6	+22.7	-11.6	327.365 C	250	1498	143	866	295.6	-1.0	+18.6	+24.1	
277.327 C	74	374	38	194	211.6	-0.1	+23.0	+0.2	328.496 C	120	950	81	636	295.2	-1.2	+18.3	+38.6	
278.510 C	59	350	32	189	211.2	-0.3	+23.2	+15.5	329.308 C	161	1018	127	798	293.5	-2.9	+18.3	+47.6	
279.413 G	59	320	34	186	210.7	-0.7	+23.2	+26.9	330.327 C	134	1076	141	1142	292.8	-3.4	+19.0	+60.3	
280.429 G	49	262	33	176	210.3	-0.9	+23.4	+39.9	331.527 G	62	550	132	1387	294.9	-1.2	+18.7	+78.2	
281.627 G	27	208	24	187	210.3	-0.7	+23.4	+55.7	332.508 G	2	83	(7	300	285.7	..	+20.0)*	+82.0	
282.432 G	17	132	21	160	210.1	-0.7	+23.4	+66.1	Means ..	..	..	..	103	723	296.2	..	+18.2	..
283.405 G	5	58	11	126	209.2	-1.5	+23.7	+78.0										
Means ..	..	..	32	197	211.2	..	+23.0	..										
Group 9579.—October 25–30. A small regular spot disappearing rather suddenly.																		
^a								^a										
298.322 C	0	28	0	134	209.2	+1.2	+21.7	-85.2	319.316 C	24	153	62	396	298.4	0.0	+17.6	-79.2	
299.357 C	10	48	16	75	209.0	+1.2	+21.4	-71.8	320.608 C	39	316	41	332	299.6	+1.3	+17.9	-61.0	
300.393 G	12	64	12	62	208.7	+1.1	+21.0	-58.4	321.424 G	97	439	79	356	299.3	+1.1	+17.8	-50.5	
301.516 G	12	84	9	60	208.6	+1.1	+20.9	-43.7	322.321 C	105	629	69	415	299.2	+1.1	+17.9	-38.8	
302.323 C	12	44	7	27	208.3	+1.0	+21.1	-33.4	323.343 C	130	654	74	373	299.0	+1.0	+17.8	-25.5	
303.368 C	7	35	4	19	208.1	+1.0	+20.8	-19.8	324.327 C	114	633	60	335	299.3	+1.4	+17.7	-12.3	
									325.406 C	92	830	48	432	298.9	+1.1	+17.4	+1.6	
									326.308 C	108	731	57	387	299.1	+1.4	+17.3	+13.6	
									327.365 C	87	574	51	339	299.2	+1.6	+17.2	+27.7	
									328.496 C	64	388	45	272	299.3	+1.9	+16.8	+42.7	
									329.308 C	54	291	47	253	299.5	+2.1	+17.0	+53.6	
									330.327 C	23	165	31	221	299.9	+2.7	+16.8	+67.4	
Group 9590.—December 12–21. Two regular spots, <i>a</i> and <i>b</i> , about 9° apart in longitude. There are occasional small companions, chiefly near the follower on December 19 and 20.																		
^a								^a										
346.353 C	11	53	(24	135	304.2	..	+21.3)*	-77.1	347.313 C	41	172	70	259	300.6	+6.1	+20.8	-68.1	
348.468 G	45	255	42	239	299.3	+5.0	+20.8	-54.1	349.341 C	55	320	42	243	298.9	+4.7	+20.8	-43.0	
350.335 C	50	306	31	193	297.8	+3.7	+21.3	-31.0	351.315 C	51	256	30	147	297.6	+3.6	+20.8	-18.3	
352.510 G	52	295	29	160	297.8	+3.9	+21.1	-2.4	353.616 C	43	302	24	168	296.9	+3.1	+21.6	+11.3	
354.430 G	57	303	33	176	295.9	+2.2	+21.1	+1.0	355.380 C	24	135	16	88	295.4	+1.8	+21.6	+23.0	
356.328 C	13	74	11	58	294.8	+1.3	+21.2	+44.9	357.402 C	2	10	3	12	298.1	+4.7	+22.4	+62.4	
Means ..	..	..	30	158	297.6	..	+21.2	..										
Group 9584.—November 15–28. A large active stream of spots. At first a simple grouping of a large regular spot, <i>a</i> , and a smaller double spot, 7° following in longitude. Small unstable followers then appear after November 17 in increasing numbers, which give the stream a complex appearance, especially on November 23, when it has nearly doubled its original length. On November 26 a large spot has developed near the place of the original follower and another, of a more composite character, at the rear of the stream; meanwhile the original leader, <i>a</i> , has decreased considerably.																		
319.316 C	24	179	62	555	297.4	0.0	+17.7	-80.2										
320.608 C	48	496	53	565	297.5	+0.2	+17.8	-63.1										
321.424 G	141	618	121	525	297.0	-0.2	+17.8	-52.8										

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1924—*continued*.

Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					
Spot a.								Spot b.									
^d					°	°	°	^d					°	°	°		
346.353 C	11	44	24	95	305.9	+11.3	+21.4	-75.4	347.313 C	27	60	53	118	294.8	+0.3	+19.8	-73.9
347.313 C	14	101	17	123	305.3	+10.8	+21.4	-63.4	348.468 G	21	145	22	149	294.8	+0.5	+19.8	-58.6
348.468 G	24	110	20	90	304.7	+10.4	+21.6	-48.7	349.341 C	33	157	26	126	294.3	+0.1	+20.1	-47.6
349.341 C	20	132	14	91	303.9	+9.7	+22.1	-38.0	350.335 C	31	194	20	126	294.2	+0.1	+20.5	-34.6
350.335 C	19	112	11	67	303.4	+9.3	+22.1	-25.4	351.315 C	32	155	19	90	294.3	+0.3	+20.4	-21.6
351.315 C	19	101	11	57	303.0	+9.0	+21.9	-12.9	352.510 G	38	208	21	112	294.9	+1.0	+20.4	-5.3
352.510 G	14	87	8	48	303.7	+9.8	+22.0	+3.5	353.616 C	27	219	15	120	294.3	+0.5	+21.1	+8.7
353.616 C	16	83	9	48	303.5	+9.7	+22.8	+17.9	354.430 G	42	250	24	143	294.0	+0.3	+20.7	+19.1
354.430 G	15	53	9	33	303.2	+9.5	+22.7	+28.3	355.380 C	16	107	10	68	293.8	+0.2	+21.0	+31.4
355.380 C	5	18	4	13	302.9	+9.3	+23.0	+40.5	356.328 C	9	62	7	47	293.2	-0.3	+20.8	+43.3
356.328 C	4	12	4	11	302.7	+9.2	+23.0	+52.8	357.402 C	0	4	0	4	293.2	-0.2	+21.1	+57.5
357.402 C	2	6	3	8	301.9	+8.5	+23.1	+66.2									

ROYAL OBSERVATORY, GREENWICH.

LEDGERS

OF

GROUPS OF SUN SPOTS

FOR THE YEAR

1924.

LEDGER II.—NON-RECURRENT GROUPS.

LEDGER II.—NON-RECURRENT GROUPS OF SUN SPOTS FOR THE YEAR 1924.

The Greenwich Civil Time at which the photograph was taken is expressed in the *first* column by the Day of the Year (civil reckoning) and decimal of a day, reckoned from Greenwich Mean Midnight.

The place where the photograph was taken is also indicated in the *first* column. A photograph taken at Greenwich is indicated by the letter G, and those taken at the Cape, Kodaikānal, Dehra Dūn, by the letters C, K, and D respectively.

The Projected Area of the Umbrae and Whole Spots, given in the *second* and *third* columns, is the area as it is measured on the photograph, uncorrected for the effect of foreshortening, and expressed in millionths of the Sun's apparent disc.

The area corrected for foreshortening given in the *fourth* and *fifth* columns is expressed in millionths of the Sun's visible hemisphere.

The longitude given in the *sixth* column is based on the ephemeris given in the *Nautical Almanac*, assuming a daily sidereal motion of $14^{\circ}.18$, due to the Sun's rotation, constant at all latitudes; this corresponds to Carrington's assumed rotation period of 25.38 days.

The proper motion given in the *seventh* column is derived from the difference of longitude thus computed from the measured positions on any given day and the first day on which the group of spots or single spot is visible, after the correction for the motion appropriate to the latitude has been applied according to the formula, $\xi = 14^{\circ}.37 - 2^{\circ}.60 \sin 2\phi$.

A *plus* sign indicates a motion forwards; a *minus* sign a motion backwards relative to the position on the first day.

The remaining columns correspond to those with similar headings in the preceding Section.

When a group is near the East or the West limb of the Sun on any particular day, and in consequence is only visible in part, the measures for that day are marked with an asterisk and are not included in taking the mean area, longitude and latitude of the group.

LEDGER II.—NON-RECURRENT GROUPS OF SUN SPOTS for the YEAR 1924—*continued*.

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					Umbræ.	Whole Spots.							
Group 9523.								Group 9527—continued.									
February 25–March 4. An active stream of normal type; rapid in growth and dissolution. The leader, <i>a</i> , which is a regular spot, alone survives to the west limb.								<i>a</i>									
<i>a</i>								111° 365 C	106	751	58	413	243° 4	–2° 3	–28° 6	–2° 2	
55° 430 C	43	230	30	160	235° 0	0° 0	+27° 2	–28° 3	112° 449 G	82	654	45	366	242° 4	–2° 8	–28° 5	+11° 1
56° 411 G	120	677	76	428	235° 3	+0° 6	+27° 2	–15° 1	113° 510 C	76	498	46	299	241° 9	–2° 9	–28° 0	+24° 6
57° 321 C	127	782	78	480	235° 1	+0° 8	+27° 7	–3° 3	114° 353 C	34	273	22	180	241° 5	–3° 0	–28° 0	+35° 3
58° 416 G	149	777	92	479	233° 3	–0° 6	+27° 6	+9° 3	115° 479 G	19	189	16	157	241° 0	–3° 0	–28° 3	+49° 7
59° 484 G	92	548	62	365	233° 0	–0° 6	+27° 5	+23° 1	116° 328 C	7	52	8	56	241° 1	–2° 6	–29° 0	+61° 0
60° 399 G	72	435	54	329	233° 2	0° 0	+27° 2	+35° 3	Means ..	..	..	34	245	243° 3	..	–28° 6	..
61° 429 G	63	283	60	273	232° 4	–0° 5	+27° 2	+48° 1	Group 9530.								
62° 459 G	26	146	37	210	232° 4	–0° 1	+26° 7	+61° 7	May 7–14. A short stream showing a brief conformity to the normal type and then rapidly dissipating.								
63° 410 G	15	56	42	158	233° 1	+0° 9	+26° 1	+74° 9	127° 360 G								
Means ..	..	..	59	320	233° 6	..	+27° 2	..	128° 450 G	19	89	13	63	4° 7	0° 0	+31° 9	–29° 6
Spot <i>a</i> .								129° 355 G	34	281	21	179	3° 8	–0° 3	+32° 1	–16° 1	
55° 430 C	17	112	12	76	237° 3	0° 0	+26° 9	–26° 0	130° 457 G	33	203	20	124	2° 6	–1° 0	+31° 5	–5° 3
56° 411 G	73	377	45	234	237° 7	+0° 7	+27° 1	–12° 7	131° 398 G	39	168	24	103	1° 1	–2° 0	+31° 7	+7° 8
57° 321 C	67	467	41	285	237° 6	+1° 0	+27° 4	–0° 8	132° 382 G	23	69	15	44	0° 3	–2° 3	+31° 5	+19° 4
58° 416 G	65	340	40	211	237° 3	+1° 1	+27° 1	+13° 3	133° 627 G	4	24	4	18	0° 9	–1° 1	+31° 3	+33° 1
59° 484 G	42	261	29	177	237° 0	+1° 1	+26° 6	+27° 1	134° 352 G	2	8	2	8	1° 7	+0° 3	+31° 8	+50° 3
60° 399 G	44	272	34	212	236° 2	+0° 7	+26° 5	+38° 3	Means ..	0	6	0	7	1° 3	+0° 3	+31° 6	+59° 5
61° 429 G	43	210	43	210	235° 5	+0° 3	+26° 5	+51° 2	Means ..	..	..	12	68	2° 0	..	+31° 7	..
62° 459 G	23	129	34	191	234° 5	–0° 3	+26° 2	+63° 8	Group 9531.								
63° 410 G	15	56	42	158	233° 1	–1° 4	+26° 1	+74° 9	May 11–21. Two spots 5° apart in longitude. The leader, <i>a</i> , survives after changes of structure between May 14 and 17. The follower, however, is more unstable and is succeeded by a cluster represented latterly by an indefinitely formed spot.								
Group 9527.								131° 398 G	16	50	13	40	291° 2	0° 0	–21° 4	–49° 7	
April 16–22. Revival of Group 9525. A stream of unstable components. The axis of the group is considerably inclined to the solar equator.								132° 382 G	86	312	57	207	290° 3	–0° 8	–21° 5	–37° 5	
106° 405 G	3	12	3	11	259° 1	0° 0	+21° 1	–52° 1	133° 627 G	89	558	50	313	290° 8	–0° 1	–20° 7	–20° 6
107° 353 G	22	66	17	49	258° 0	–0° 9	+20° 9	–40° 6	134° 352 G	101	610	54	327	290° 7	–0° 1	–20° 8	–11° 1
108° 363 G	71	286	45	183	256° 5	–2° 3	+21° 1	–28° 8	135° 491 C	157	935	83	495	290° 7	+0° 1	–20° 7	+4° 0
109° 459 G	69	297	39	173	256° 1	–2° 5	+21° 6	–14° 7	136° 348 C	170	1186	92	646	289° 6	–0° 9	–20° 8	+14° 2
110° 460 G	34	153	19	86	255° 8	–2° 6	+22° 1	–1° 8	137° 354 G	166	911	99	542	289° 4	–0° 9	–20° 8	+27° 3
111° 365 C	20	83	11	48	255° 2	–3° 1	+22° 8	+9° 6	138° 475 G	85	529	61	376	288° 7	–1° 5	–21° 4	+41° 4
112° 449 G	3	27	2	17	254° 5	–3° 6	+23° 0	+23° 2	139° 351 G	41	335	36	296	288° 9	–1° 2	–21° 4	+53° 2
Means ..	..	..	19	80	256° 5	..	+21° 8	..	140° 606 G	18	112	28	187	290° 3	+0° 4	–20° 7	+71° 2
Group 9528.								141° 353 G	1	42	4	160	291° 8	+2° 0	–20° 2	+82° 6	
April 18–26. A short compact stream appearing near its maximum development almost as a single compound spot. This group closely follows Group 9529, with which it might have been associated as the following component of a large complex stream. A clear separation, however, is usually seen between the two groups, and their respective developments appear, moreover, to be largely independent.								Means ..	..	..	52	326	290° 2	..	–21° 0	..	
Spot <i>a</i> .								131° 398 G									
108° 363 G	39	183	26	125	246° 9	0° 0	–28° 9	–38° 4	132° 382 G	7	16	5	12	293° 5	0° 0	–21° 4	–47° 4
109° 459 G	69	386	42	230	246° 5	0° 0	–29° 3	–24° 3	133° 627 G	28	99	18	62	293° 6	+0° 2	–21° 2	–34° 2
110° 460 G	71	682	40	382	244° 9	–1° 1	–28° 8	–12° 7		40	253	22	139	294° 0	+0° 8	–20° 4	–17° 4

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1924—*continued*.

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					Umbræ.	Whole Spots.							
Group 9531—Spot <i>a</i> —continued.								Group 9541.									
June 10-18. Two or three small spots on June 10-13, becoming a short-lived stream of normal type.								June 10-18. Two or three small spots on June 10-13, becoming a short-lived stream of normal type.									
<i>a</i> .								<i>a</i> .									
134.352 G	40	295	21	156	294.0	+0.9	-20.6	-7.8	161.364 G	2	6	1	4	268.2	0.0	+22.2	-36.2
135.491 C	82	472	43	250	293.2	+0.3	-20.5	+6.5	162.585 G	6	27	3	15	268.6	+0.6	+22.2	-19.6
136.348 C	99	558	54	307	292.8	0.0	-20.7	+17.4	163.360 G	7	44	4	24	268.1	+0.3	+22.0	-9.9
137.354 G	85	439	52	268	292.6	0.0	-21.0	+30.5	164.375 C	26	117	14	64	268.3	+0.7	+22.0	+3.8
138.475 G	43	270	32	200	292.1	-0.4	-21.0	+44.8	165.467 G	41	263	24	148	267.9	+0.5	+22.3	+17.8
139.351 G	17	144	16	135	291.8	-0.6	-20.9	+56.1	166.387 G	61	351	39	223	270.0	+2.7	+22.7	+32.1
140.606 G	11	102	19	175	291.9	-0.3	-20.8	+72.8	167.345 G	48	259	36	199	271.0	+3.9	+22.5	+45.8
141.353 G	1	42	4	160	291.8	-0.3	-20.2	+82.6	168.570 G	33	153	40	185	273.0	+6.1	+22.9	+64.0
									169.506 G	8	42	17	89	272.4	+5.7	+23.1	+75.8
Group 9534.								Group 9542.									
May 17-27. A small regular spot gradually dying out. A small follower is seen on May 23 and 24.								June 13-19. At first a few small spots in a stream which later, near the west limb, shows a tendency to normal type.									
137.354 G	0	7	0	34	177.7	0.0	-23.0	-84.4	164.375 C	15	43	9	26	246.0	0.0	-25.1	-18.5
138.475 G	10	30	16	47	176.4	-1.1	-22.7	-70.9	165.467 G	17	60	10	34	246.2	+0.5	-24.7	-3.9
139.351 G	12	83	12	85	176.9	-0.4	-22.6	-58.8	166.387 G	15	73	8	41	246.9	+1.4	-24.7	+9.0
140.606 G	18	91	13	66	176.5	-0.6	-22.2	-42.6	167.345 G	11	36	7	22	247.2	+2.0	-24.9	+22.0
141.353 G	17	93	11	59	176.6	-0.4	-22.2	-32.6	168.570 G	20	100	14	71	247.1	+2.2	-25.0	+38.1
142.360 G	17	85	10	48	176.2	-0.6	-21.8	-19.7	169.506 G	22	102	19	91	247.0	+2.4	-25.1	+50.4
143.364 G	11	52	6	28	175.4	-1.2	-21.6	-7.2	170.397 G	9	56	12	72	247.8	+3.4	-25.1	+63.0
144.411 G	11	46	6	25	174.7	-1.8	-21.4	+6.0	Means ..	..	..	11	51	246.9	..	-24.9	..
145.461 G	10	18	6	10	174.5	-1.8	-21.6	+19.7									
146.352 G	6	10	4	6	174.1	-2.0	-21.6	+31.1									
147.382 C	2	8	1	6	173.8	-2.1	-21.5	+44.4									
Means ..	..	..	8	38	175.7	..	-22.0	..	Group 9543.								
Group 9535.								June 19-28. A group of "stream" type, in high northern latitude, consisting of a small regular spot, <i>a</i> , followed by a tiny cluster which has disappeared by June 24.									
May 18-28. Intermittent. A small but persistent spot in high northern latitude, followed by facule in which small spots appear on May 21. The group has disappeared by May 25, but three ephemeral spots are seen on May 28.								170.397 G									
138.475 G	4	15	7	24	181.8	0.0	+37.4	-65.5	171.583 G	25	138	17	99	137.8	+1.4	+37.1	-31.3
139.351 G	7	16	8	18	181.0	-0.1	+37.2	-54.7	172.360 G	18	155	11	102	138.0	+2.2	+37.4	-20.8
140.606 G	6	18	5	15	180.7	+0.5	+37.1	-38.4	173.395 G	28	140	17	86	140.7	+5.6	+36.9	-4.4
141.353 G	21	78	17	63	173.8	-5.8	+37.6	-35.4	174.359 G	20	136	12	83	139.7	+5.3	+36.8	+7.3
142.360 G	28	131	19	92	173.0	-5.8	+37.0	-22.9	175.395 G	23	143	15	93	139.9	+6.3	+36.7	+21.2
143.364 G	27	102	18	67	173.5	-4.5	+37.5	-9.1	176.301 G	18	120	13	86	139.4	+6.5	+36.7	+32.7
144.411 G	11	37	7	24	173.6	-3.6	+37.1	+4.9	177.304 G	16	100	14	85	138.7	+6.5	+36.5	+45.3
145.461 G	0	0	0	0	..	..	..	..	178.367 G	15	60	17	68	138.1	+6.7	+36.7	+58.8
146.352 G	0	0	0	0	..	..	..	..	179.304 G	1	3	2	5	136.9	+6.2	+36.5	+70.0
147.382 C	0	0	0	0	..	..	..	..	Means ..	..	..	13	75	138.6	..	+36.8	..
148.359 G	8	28	8	29	168.8	-5.3	+37.9	+52.3	Spot <i>a</i> .								
Means ..	..	..	8	30	175.8	..	+37.4	..	170.397 G	14	35	12	31	138.6	0.0	+36.7	-46.2
									171.583 G	19	91	13	64	139.8	+2.1	+37.1	-29.3
									172.360 G	16	112	10	73	140.3	+3.2	+37.4	-18.5
									173.395 G	27	137	16	84	140.8	+4.4	+36.9	-4.3

LEDGER II.—NON-RECURRENT GROUPS OF SUN SPOTS for the YEAR 1924—*continued*.

Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date. G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.
	Umbrae.	Whole Spots.	Umbrae.	Whole Spots.					Umbrae.	Whole Spots.					
Group 9543—Spot <i>a</i> —continued.															
d					o	o	o	o							
174.359 G	20	126	12	77	140.4	+4.7	+36.7	+8.0							
175.395 G	23	143	15	93	139.9	+5.0	+36.7	+21.2							
176.301 G	18	120	13	86	139.4	+5.2	+36.7	+32.7							
177.304 G	16	100	14	85	138.7	+5.2	+36.5	+45.3							
178.367 G	15	60	17	68	138.1	+5.4	+36.7	+58.8							
179.304 G	1	3	2	5	136.9	+4.9	+36.5	+70.0							
Group 9546.															
July 1-11. A few unstable spots in a stream, from which a small regular spot emerges as the leader on July 6.															
182.368 G	2	17	2	16	328.9	0.0	+17.5	-57.4							
183.478 G	8	45	6	32	328.3	-0.5	+18.7	-43.4							
184.435 G	15	61	9	36	331.0	+2.3	+18.8	-28.0							
185.497 C	29	87	16	47	330.1	+1.5	+19.0	-14.8							
186.368 G	46	254	25	132	328.7	+0.2	+18.9	-4.7							
187.402 G	46	228	24	122	330.8	+2.4	+19.8	+11.1							
188.570 G	40	202	24	120	332.8	+4.5	+19.8	+28.5							
189.308 G	35	182	23	121	333.2	+5.0	+19.9	+38.7							
190.350 G	21	117	17	99	333.7	+5.6	+20.0	+53.0							
191.307 G	11	79	14	97	333.8	+5.8	+20.4	+65.8							
192.349 G	7	36	19	99	334.5	+6.6	+20.5	+80.3							
Means ..	..	..	17	84	331.4	..	+19.4	..							
Group 9550.															
July 7-12. Revival of Group 9542. One or two very small spots in conspicuous faculae.															
188.570 G	1	15	1	17	246.2	0.0	-26.0	-58.1							
189.308 G	1	8	1	7	246.2	+0.3	-26.1	-48.3							
190.350 G	5	17	4	13	243.2	-2.4	-27.2	-37.5							
191.307 G	6	34	4	22	242.7	-2.6	-27.5	-25.3							
192.349 G	7	24	4	14	242.1	-2.8	-27.6	-12.1							
193.306 G	0	8	0	5	241.9	-2.7	-27.9	+0.3							
Means ..	..	..	2	13	243.7	..	-27.0	..							
Group 9555.															
July 21-29. A stream of generally insignificant spots.															
202.453 G	7	30	4	18	92.1	0.0	+27.5	-28.5							
203.357 G	31	93	18	53	90.6	-1.2	+27.4	-18.0							
204.370 G	17	62	9	33	91.9	+0.5	+27.6	-3.3							
205.364 G	37	152	20	85	93.8	+2.8	+28.3	+11.8							
206.397 G	12	44	7	26	91.2	+0.5	+28.6	+22.8							
207.392 G	10	29	7	19	89.8	-0.5	+28.4	+34.6							
208.315 G	5	17	4	14	90.9	+0.9	+28.0	+47.9							
209.188 K	13	73	12	68	87.1	-2.6	+26.5	+55.7							
210.369 G	13	83	20	128	87.7	-1.5	+25.5	+71.9							
Means ..	..	..	11	49	90.6	..	+27.5	..							
Group 9556.															
July 25-August 6. A stream pertaining to the normal type in which the following component is never conspicuous. This group, which is an entirely new formation, precedes a well-defined area of faculae which represents the place of Group 9545. Spot <i>a</i> is the leader.															
a					o	o	o	o							
206.397 G	0	3	0	6	352.9	0.0	+34.7	-75.5							
207.392 G	14	49	15	54	354.0	+1.7	+34.7	-61.2							
208.315 G	57	222	46	183	355.8	+4.2	+34.8	-47.2							
209.188 K	44	230	31	159	357.0	+5.9	+34.8	-34.4							
210.369 G	57	253	34	153	357.1	+6.8	+34.7	-18.7							
211.411 G	52	281	30	162	356.2	+6.5	+34.9	-5.9							
212.363 G	43	296	25	171	356.0	+7.0	+35.0	+6.5							
213.383 C	40	317	25	192	355.8	+7.4	+34.8	+19.8							
214.427 G	58	266	40	180	355.6	+7.9	+34.3	+33.4							
215.362 G	39	191	31	153	355.9	+8.8	+34.4	+46.1							
216.387 G	35	128	37	134	355.6	+9.2	+34.6	+59.3							
217.352 G	17	70	26	109	354.7	+8.9	+34.3	+71.2							
218.482 G	5	27	20	110	354.2	+9.1	+34.5	+85.7							
Means ..	..	..	28	136	355.4	..	+34.6	..							
Spot <i>a</i> .															
207.392 G	9	26	9	27	356.1	0.0	+34.4	-59.1							
208.315 G	36	137	28	108	357.9	+2.4	+34.8	-45.1							
209.188 K	32	196	22	133	358.6	+3.7	+35.0	-32.8							
210.369 G	37	193	22	116	359.1	+4.9	+34.8	-16.7							
211.411 G	45	222	26	127	358.9	+5.4	+34.9	-3.2							
212.363 G	33	228	19	132	358.5	+5.6	+34.8	+9.0							
213.383 C	37	257	23	157	357.7	+5.5	+34.6	+21.7							
214.427 G	37	175	26	121	357.3	+5.7	+34.7	+35.1							
215.362 G	28	155	23	126	356.5	+5.6	+34.6	+46.7							
216.387 G	28	110	30	117	356.1	+5.8	+34.7	+59.8							
217.352 G	15	59	24	94	355.4	+5.8	+34.6	+71.9							
218.482 G	5	27	20	110	354.2	+5.3	+34.5	+85.7							
Group 9557.															
July 30-August 4. A short stream of small components of which one at the rear alone remains on August 4.															
211.411 G	0	6	0	18	280.5	0.0	+39.7	-81.6							
212.363 G	3	17	4	25	279.5	-0.2	+37.4	-70.0							
213.383 C	3	23	3	24	279.0	+0.1	+37.8	-57.0							
214.427 G	10	22	8	18	278.1	+0.1	+38.6	-44.1							
215.362 G	4	12	3	8	277.2	0.0	+38.8	-32.6							
216.387 G	2	3	1	2	273.5	-2.9	+40.2	-22.8							
Means ..	..	..	3	16	278.0	..	+38.8	..							

LEDGER II.—NON-RECURRENT GROUPS OF SUN SPOTS for the YEAR 1924—continued.

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.		
	Umbrae.	Whole Spots.	Umbrae.	Whole Spots.					Umbrae.	Whole Spots.							
Group 9563.								Group 9564.									
August 15-27. A stream of normal type in which the first stages of its development have taken place when it comes into view at the east limb. The leader, <i>a</i> , preserves its regular form until it reaches the west limb, when it apparently divides into two parts. This division is preceded by the appearance of a bright "bridge" seen first on August 22. The follower, <i>b</i> , 12° behind the leader, has diminished to a dot on August 21; it has disappeared on August 22, but reappears temporarily on August 23 and 24.								August 28-September 6. A very large group of the "stream" type developing with extreme rapidity from two small spots or close clusters of spots photographed on August 28. Both the leading spot, <i>a</i> , and the following spot, <i>b</i> , are very large and somewhat composite in character; the leader becomes increasingly unstable and has broken up into several components by September 4. A cluster of small spots is prominent on August 30, and although this practically disappears, a chain of spots is formed later in its place from disintegrated portions of <i>a</i> and <i>b</i> .									
d					°	°	°	d					°	°	°		
227° 367 G	18	112	35	279	71° 0	0° 0	+16° 4	-80° 1	240° 331 C	23	101	14	60	308° 6	0° 0	+20° 8	-31° 2
228° 380 G	41	274	51	359	69° 3	-1° 7	+16° 8	-68° 4	241° 462 G	208	1154	113	624	308° 7	+0° 3	+22° 1	-16° 1
229° 609 G	75	441	60	357	69° 5	-1° 5	+16° 9	-51° 9	242° 475 G	441	1903	216	990	308° 3	0° 0	+22° 0	-3° 1
230° 575 G	77	462	49	301	69° 4	-1° 6	+17° 2	-39° 3	243° 564 G	416	2192	220	1159	308° 1	0° 0	+22° 0	+11° 0
231° 394 G	107	515	61	298	70° 0	-1° 0	+17° 2	-27° 9	244° 575 G	395	2176	222	1220	307° 2	-0° 7	+21° 7	+23° 5
232° 448 G	75	392	40	203	71° 8	+0° 8	+16° 4	-12° 1	245° 328 C	349	2070	214	1281	307° 0	-0° 8	+21° 6	+33° 2
233° 379 G	64	346	33	176	74° 7	+3° 7	+15° 7	-3° 1	246° 622 G	223	1617	177	1275	306° 9	-0° 7	+21° 2	+50° 2
234° 363 G	57	281	30	149	75° 1	+4° 1	+15° 3	+16° 5	247° 343 C	128	1207	124	1180	306° 6	-0° 9	+21° 4	+59° 4
235° 416 G	54	291	31	169	74° 6	+3° 6	+14° 9	+29° 9	248° 441 G	88	534	142	837	305° 4	-1° 9	+20° 9	+72° 8
236° 229 D	43	269	28	176	74° 6	+3° 6	+15° 0	+40° 6	249° 428 G	20	136	(52	381	301° 5	..	+21° 0)*	+81° 9
237° 376 C	30	187	26	165	74° 7	+3° 7	+14° 8	+55° 9	Means ..	..	..	160	958	307° 4	..	+21° 5	..
238° 358 C	8	107	10	140	74° 4	+3° 4	+14° 5	+68° 6									
239° 387 G	5	26	16	82	74° 5	+3° 5	+14° 4	+82° 3									
Means ..	..	..	36	220	72° 6	..	+15° 8	..									
Spot a.								Spot a.									
227° 367 G	18	101	35	198	74° 6	0° 0	+15° 9	-76° 5	240° 331 C	10	49	6	29	310° 4	0° 0	+21° 2	-29° 4
228° 380 G	29	165	31	177	74° 8	+0° 2	+15° 6	-62° 9	241° 462 G	90	474	48	251	312° 2	+2° 0	+21° 8	-12° 6
229° 609 G	48	249	35	179	75° 2	+0° 6	+15° 3	-46° 2	242° 475 G	175	751	91	391	313° 1	+3° 0	+22° 1	+1° 7
230° 575 G	53	263	32	158	75° 0	+0° 4	+15° 6	-33° 7	243° 564 G	179	940	97	508	314° 0	+4° 1	+22° 0	+16° 9
231° 394 G	66	307	36	169	75° 1	+0° 5	+15° 9	-22° 8	244° 575 G	168	781	99	461	313° 7	+4° 0	+21° 7	+30° 0
232° 448 G	62	293	32	149	75° 0	+0° 4	+15° 6	-8° 9	245° 328 C	150	998	99	659	313° 0	+3° 4	+21° 6	+39° 2
233° 379 G	63	338	32	172	75° 0	+0° 4	+15° 6	+3° 4	246° 622 G	103	707	92	629	312° 8	+3° 4	+21° 4	+56° 1
234° 363 G	57	281	30	149	75° 1	+0° 5	+15° 3	+16° 5	247° 343 C	47	468	55	552	312° 9	+3° 6	+21° 8	+65° 7
235° 416 G	54	284	31	165	74° 9	+0° 3	+14° 8	+30° 2	248° 441 G	23	123	57	303	312° 9	+3° 8	+21° 4	+80° 3
236° 229 D	37	252	24	166	75° 2	+0° 6	+14° 7	+41° 2									
237° 376 C	30	187	26	165	74° 7	+0° 1	+14° 8	+55° 9									
238° 358 C	8	107	10	140	74° 4	-0° 2	+14° 5	+68° 6									
239° 387 G	5	26	16	82	74° 5	-0° 1	+14° 4	+82° 3									
Spot b.								Spot b.									
228° 380 G	11	99	19	168	63° 7	0° 0	+18° 1	-74° 0	240° 331 C	13	52	8	31	307° 2	0° 0	+20° 4	-32° 6
229° 609 G	27	184	25	171	63° 5	-0° 2	+18° 5	-57° 9	241° 462 G	102	565	56	311	305° 7	-1° 3	+22° 0	-19° 1
230° 575 G	24	199	17	143	63° 3	-0° 4	+18° 9	-45° 4	242° 475 G	213	965	111	502	304° 4	-2° 5	+22° 1	-7° 0
231° 394 G	41	208	25	129	63° 3	-0° 4	+18° 9	-34° 6	243° 564 G	225	1167	117	606	303° 1	-3° 6	+22° 0	+6° 0
232° 448 G	12	93	7	51	62° 9	-0° 8	+18° 6	-21° 0	244° 575 G	202	1184	109	639	302° 1	-4° 4	+21° 7	+18° 4
233° 379 G	1	8	1	4	63° 2	-0° 5	+20° 2	-8° 4	245° 328 C	199	1072	115	622	300° 7	-5° 7	+21° 7	+26° 9
									246° 622 G	120	910	85	646	301° 2	-5° 0	+21° 1	+44° 5
									247° 343 C	81	739	69	628	301° 1	-5° 0	+21° 1	+53° 9
									248° 441 G	65	411	85	534	301° 1	-4° 8	+20° 6	+68° 5
									249° 428 G	20	136	52	381	301° 5	-4° 3	+21° 0	+81° 9

LEDGER II.—NON-RECURRENT GROUPS OF SUN SPOTS for the YEAR 1924—continued.

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.
	Umbrae.	Whole Spots.	Umbrae.	Whole Spots.			
Group 9566.							
September 5-10. A small stream of unimportant spots of which only the leader is seen on September 9.							
^a 248.441 G	2	4	1	2	236.7	0.0	-28.0
249.428 G	6	21	4	14	239.1	+2.7	-27.2
250.233 D	18	71	13	50	238.8	+2.7	-27.3
251.382 G	10	47	9	41	237.4	+1.7	-27.5
252.437 G	4	15	6	21	242.6	+7.3	-26.1
253.361 G	0	11	0	21	236.7	+1.7	-26.7
Means ..	..	..	6	25	238.6	..	-27.1
Group 9567.							
September 10-19. A group of the stream type developing from two spot centres seen on September 10 in a position lightly marked by faculae on the previous day. A quasi-regular spot has appeared as the leader by September 12, after which the following members decrease. The axis of the group is considerably inclined to the Sun's equator.							
253.361 G	20	95	17	81	114.2	0.0	+22.7
254.412 G	59	412	39	277	113.0	-1.0	+23.8
255.326 C	103	561	61	328	114.1	+0.3	+23.3
256.422 G	113	617	60	331	114.0	+0.4	+23.0
257.378 G	81	432	42	225	113.7	+0.3	+22.4
258.507 G	62	442	33	238	114.8	+1.6	+22.4
259.377 G	23	168	13	97	116.3	+3.3	+22.1
260.340 C	31	180	21	124	117.6	+4.8	+21.8
261.329 C	17	96	16	88	119.2	+6.5	+22.0
262.321 C	4	22	6	31	119.2	+6.7	+22.1
Means ..	..	..	31	182	115.6	..	+22.6
Group 9568.							
September 18-27. Two small spots appearing from a small compact mass of faculae at the Sun's south-east limb. These fail to develop, but small variable spots or clusters of spots continue to mark their place at the two extremities of the disturbance, which lengthens out considerably as shown by a comparison of the faculae on September 18 and 27.							
261.329 C	2	4	3	6	356.8	0.0	-23.3
262.321 C	27	107	27	107	357.1	+0.6	-24.1
263.336 C	24	153	18	118	357.2	+0.9	-24.1
264.380 G	56	205	37	136	356.2	+0.2	-24.9
265.414 G	84	416	51	252	356.1	+0.4	-25.3
266.648 G	52	396	31	233	355.4	0.0	-25.2
267.393 G	43	237	26	145	354.8	-0.4	-25.0
268.366 C	30	132	19	87	354.7	-0.2	-25.1
269.348 C	14	58	11	44	354.9	+0.3	-24.9
270.420 G	0	6	0	6	351.6	-2.7	-27.1
Means ..	..	..	22	113	355.5	..	-24.9
Group 9574.							
October 1-8. A regular spot diminishing to a very small marking before disappearing after October 8. There is a small distant follower on October 5 and a few close ones on October 7 and 8. The group evidently represents the last phases of a stream which completed its earlier development on the invisible hemisphere.							
^a 274.362 C	11	74	19	127	176.2	0.0	+25.5
275.334 C	14	103	15	110	175.5	-0.4	+25.7
276.452 G	21	111	16	85	174.9	-0.7	+25.8
277.327 C	26	112	17	73	174.8	-0.5	+25.9
278.510 C	21	86	12	49	174.2	-0.7	+26.4
279.413 G	10	33	5	18	174.2	-0.4	+26.0
280.429 G	8	44	4	23	172.9	-1.4	+26.4
281.627 G	5	20	3	11	172.6	-1.4	+25.9
Means ..	..	..	11	62	174.4	..	+26.0
Group 9575.							
October 3-15. A stream of roughly normal type but of remarkable length, the greatest distance between the leading and following spots being 17°. The group is a few days old when first seen at the Sun's east limb. The leader, <i>a</i> , appears throughout as a small contracting regular spot. The last definite trace of the follower, <i>b</i> , is visible on October 11, although one or two of the small spots which have hitherto preceded it, continue until October 14.							
276.452 G	9	80	(28	252	146.8	..	-27.3)
277.327 C	35	223	55	487	140.3	0.0	-28.5
278.510 C	51	419	63	513	137.8	-2.1	-28.5
279.413 G	95	527	86	502	136.5	-3.0	-28.7
280.429 G	89	582	67	439	136.1	-3.0	-28.7
281.627 G	112	669	73	434	135.9	-2.8	-27.9
282.432 G	81	424	50	261	136.0	-2.4	-28.2
283.405 G	58	295	36	180	137.8	-0.2	-27.7
284.347 C	41	340	27	221	136.5	-1.1	-28.1
285.369 C	46	282	34	206	138.0	+0.7	-28.2
286.447 G	19	119	18	117	142.3	+5.4	-27.1
287.467 G	17	66	25	100	142.1	+5.6	-26.9
288.368 C	4	24	13	79	142.9	+6.8	-26.6
Means ..	..	..	46	295	138.5	..	-27.9
Spot <i>a</i> .							
277.327 C	20	108	30	164	146.9	0.0	-27.3
278.510 C	19	167	18	159	146.0	-0.5	-26.9
279.413 G	59	246	46	192	145.1	-1.0	-26.8
280.429 G	41	277	27	186	144.4	-1.3	-26.5
281.627 G	45	253	27	152	144.4	-0.9	-26.1
282.432 G	34	183	20	108	144.0	-1.0	-26.5
283.405 G	36	184	22	112	143.6	-1.0	-26.5
284.347 C	22	172	15	114	143.5	-0.7	-26.4
285.369 C	28	160	22	123	143.6	-0.3	-26.3
286.447 G	15	107	15	108	143.6	+0.1	-26.8
287.467 G	14	59	22	93	143.3	+0.2	-26.6
288.368 C	4	24	13	79	142.9	+0.2	-26.6

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1924—*continued.*

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.
	Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					Umbræ.	Whole Spots.	Umbræ.	Whole Spots.			
Group 9575—continued.															
Spot b.															
d					o	o	o						o	o	
277.327 C	0	42	0	184	133.2	0.0	-31.0	-78.2							
278.510 C	22	173	35	272	131.7	-1.1	-30.2	-64.0							
279.413 G	32	269	36	299	130.1	-2.3	-30.6	-53.7							
280.429 G	39	210	33	176	129.4	-2.6	-30.2	-41.0							
281.627 G	46	181	32	127	127.9	-3.7	-29.9	-26.7							
282.432 G	24	107	16	70	127.4	-3.9	-29.9	-16.6							
283.405 G	19	80	12	50	126.5	-4.4	-30.2	-4.7							
284.347 C	17	76	11	48	125.5	-5.0	-30.2	+6.8							
Group 9576.															
October 13-26. Revival near Group 9569 of the previous rotation. A very large regular spot, <i>a</i> , showing minor changes both of umbra and penumbra. A following spot seen at the east limb divides into two by October 16 and so disappears, but a number of very small markings are evidence of continued activity in the faculæ following <i>a</i> .															
286.447 G	12	105	(39	344	8.2	..	+22.7)*	-82.8							
287.467 G	44	300	73	505	5.6	0.0	+23.8	-72.0							
288.368 C	112	563	117	572	5.9	+0.5	+23.7	-59.8							
289.339 C	125	747	95	562	6.4	+1.2	+22.7	-46.5							
290.339 C	131	896	82	559	6.4	+1.4	+22.6	-33.3							
291.405 G	152	1005	84	553	6.2	+1.4	+22.7	-19.4							
292.383 C	143	988	76	523	6.1	+1.5	+22.7	-6.6							
293.352 C	166	1051	88	556	5.3	+0.9	+22.8	+5.3							
294.319 C	154	784	85	431	4.9	+0.7	+22.9	+17.7							
295.620 G	99	736	62	463	4.7	+0.8	+22.7	+34.7							
296.438 G	103	617	75	450	4.5	+0.8	+22.8	+45.2							
297.509 C	98	439	98	438	4.5	+1.0	+23.1	+59.4							
298.322 C	44	285	62	402	3.9	+0.6	+23.0	+69.5							
299.357 C	11	109	42	416	4.8	+1.7	+23.0	+84.0							
Means ..	..	..	80	495	5.3	..	+23.0	..							
Spot a.															
286.447 G	12	105	39	344	8.2	0.0	+22.7	-82.8							
287.467 G	33	218	48	316	7.1	-0.9	+22.9	-70.5							
288.368 C	83	465	80	446	7.5	-0.3	+22.7	-58.2							
289.339 C	110	687	81	508	6.9	-0.7	+22.4	-46.0							
290.339 C	123	861	76	534	6.7	-0.7	+22.4	-33.0							
291.405 G	152	988	84	543	6.4	-0.8	+22.7	-19.2							
292.383 C	142	946	75	501	6.1	-0.9	+22.7	-6.6							
293.352 C	166	991	88	525	5.5	-1.3	+23.0	+5.5							
294.319 C	154	761	85	419	5.0	-1.6	+22.9	+17.8							
295.620 G	99	716	62	451	4.9	-1.4	+22.8	+34.9							
296.438 G	103	617	75	450	4.5	-1.6	+22.8	+45.2							
297.509 C	97	423	97	423	4.5	-1.4	+23.1	+59.4							
298.322 C	44	285	62	402	3.9	-1.8	+23.0	+69.5							
299.357 C	11	109	42	416	4.8	-0.7	+23.0	+84.0							

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.	Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.
	Umbræ.	Whole Spots.	Umbræ.	Whole Spots.					Umbræ.	Whole Spots.	Umbræ.	Whole Spots.			
Group 9578.															
October 25-November 2. A group of the stream type arising from two close pairs of tiny spots seen on October 25. The rapid separation in longitude of the two spot centres is very marked.															
d					o	o	o						o	o	
298.322 C	11	49	7	29	266.0	0.0	+21.5	-28.4							
299.357 C	75	310	41	168	266.4	+0.6	+21.3	-14.4							
300.393 G	95	383	50	201	266.3	+0.6	+21.6	-0.8							
301.516 G	67	310	36	168	267.3	+1.8	+21.4	+15.0							
302.323 C	45	200	26	116	267.6	+2.2	+21.5	+25.9							
303.368 C	24	153	16	104	267.8	+2.6	+21.2	+39.9							
304.549 C	20	80	19	74	269.1	+4.0	+20.5	+56.8							
305.411 C	8	50	10	63	266.8	+1.9	+20.8	+65.9							
306.415 C	2	17	6	48	268.4	+3.6	+20.6	+80.7							
Means ..	..	..	23	108	267.3	..	+21.2	..							
Group 9581.															
November 11-16. Revival of Group 9577. A small stream not seen on November 13. Only the rear spot remains on November 16.															
315.403 G	8	25	8	24	12.1	0.0	+21.4	-57.1							
316.255 D	11	41	8	30	12.7	+0.7	+21.8	-45.3							
317.447 C	0	0	0	0	..	..	..	..							
318.310 C	28	112	16	63	10.1	-1.5	+21.1	-20.8							
319.316 C	20	54	11	29	10.3	-1.2	+21.3	-7.3							
320.608 C	2	31	1	16	7.8	-3.5	+22.0	+7.2							
Means ..	..	..	7	27	10.6	..	+21.5	..							
Group 9583.															
November 15-20. A small group of stream type composed generally of two small clusters of spots at the front and rear respectively.															
319.316 C	11	58	6	33	4.0	0.0	+26.9	-13.6							
320.608 C	13	160	7	88	4.2	+0.7	+27.0	+3.6							
321.424 G	46	255	26	144	3.2	-0.1	+27.3	+13.4							
322.321 C	19	126	11	77	3.5	+0.6	+27.5	+25.5							
323.343 C	10	84	7	58	1.5	-1.1	+27.8	+37.0							
324.327 C	2	17	2	15	2.2	0.0	+26.7	+50.6							
Means ..	..	..	10	69	3.1	..	+27.2	..							
Group 9585.															
November 18-December 1. A large and somewhat irregularly-shaped spot in the following portion of an extensive area of faculæ. It is preceded by a small companion suggestive of a larger spot when on the invisible hemisphere. Other small companions appear from time to time, in general preceding the chief spot. The retrograde motion in longitude is very marked.															
322.321 C	22	175	63	504	258.6	0.0	+23.8	-79.4							
323.343 C	63	551	87	778	257.5	-0.9	+23.7	-67.0							
324.327 C	120	807	114	770	255.7	-2.4	+24.6	-55.9							

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1924—*continued*.

Date, G.M.T. (Civil) Place.	Projected Area.		Corrected Area.		Longitude and Proper Motion.	Latitude.	Long. from C.M.
	Umbrae.	Whole Spots.	Umbrae.	Whole Spots.			
Group 9585—continued.							
a					o	o	o
325.406 C	171	1027	124	752	254.9	-2.9	+24.7
326.308 C	147	1138	93	724	254.6	-3.0	+24.8
327.365 C	154	1240	87	705	254.0	-3.4	+24.8
328.496 C	148	1126	81	618	253.5	-3.6	+24.8
329.308 C	94	862	52	474	252.5	-4.4	+24.4
330.327 C	110	554	64	321	251.8	-4.8	+24.4
331.527 G	113	569	75	376	251.3	-5.0	+23.8
332.508 G	71	492	56	389	250.7	-5.4	+23.7
333.322 C	56	416	56	416	250.4	-5.5	+23.9
334.369 C	29	206	47	337	249.8	-5.8	+23.7
335.446 G	13	51	62	244	248.6	-6.8	+23.5
Means ..	..	..	76	529	253.1	..	+24.2
Group 9588.							
December 7-16. Revival near the place of Group 9581. A small regular spot, with double umbra, which has divided into two components on December 8-9. The leading component remains on December 15 as a small but perfectly defined umbral spot. There is a tiny distant follower on December 12.							
341.373 C	14	111	25	200	14.2	0.0	+21.0
342.349 C	22	141	24	151	14.1	0.0	+20.8
343.437 G	27	138	21	105	14.6	+0.7	+20.8
344.321 C	22	143	14	92	14.7	+0.9	+20.9
345.329 C	30	170	17	97	15.0	+1.4	+20.8
346.353 C	25	97	14	52	14.8	+1.3	+21.0
347.313 C	18	65	10	35	15.2	+1.8	+21.1
348.468 G	22	43	13	25	15.4	+2.2	+20.8
349.341 C	12	24	8	16	16.3	+3.2	+21.1
350.335 C	4	12	3	10	16.9	+4.0	+21.0
Means ..	..	..	15	78	15.1	..	+20.9
Group 9589.							
December 9-15. A small stream <i>n.f.</i> Group 9588.							
343.437 G	6	22	7	25	0.1	0.0	+27.6
344.321 C	23	98	19	82	0.6	+0.8	+27.5
345.329 C	25	191	17	130	0.7	+1.3	+27.2
346.353 C	27	109	17	67	358.8	-0.2	+27.9
347.313 C	22	114	13	65	0.0	+1.4	+27.3
348.468 G	3	70	2	40	358.4	+0.2	+28.3
349.341 C	1	21	1	12	356.2	-1.7	+29.1
Means ..	..	..	11	60	359.3	..	+27.8
Group 9591.							
December 15-22. Intermittent. One or two very small spots on December 15 and 16; on December 19, a double spot, which breaks up into a faint cluster by December 21.							
349.341 C	1	3	1	3	286.2	0.0	+18.9
350.335 C	1	4	1	3	286.3	+0.2	+18.5
351.315 C	0	0	0	0	..	..	..
Group 9591—continued.							
d					o	o	o
352.510 G	0	0	0	0	..	..	..
353.616 C	7	83	4	44	284.4	-1.5	+19.1
354.430 G	18	46	10	25	284.1	-1.7	+18.3
355.380 C	2	18	1	10	284.3	-1.4	+18.3
356.328 C	0	4	0	3	282.8	-2.9	+19.2
Means ..	..	..	2	11	284.7	..	+18.7
Group 9592.							
December 17-24. A few small unstable spots in the extreme southern portion of a large faculose area, immediately following Group 9590, in which Groups 9591 and 9592a are also contained.							
351.315 C	4	14	2	8	287.7	0.0	+14.4
352.510 G	14	56	7	30	287.0	-0.7	+13.8
353.616 C	1	20	1	11	287.6	-0.2	+14.3
354.430 G	1	10	1	5	286.9	-0.9	+14.0
355.380 C	10	30	5	18	289.3	+1.4	+13.7
356.328 C	9	39	6	26	289.4	+1.5	+13.6
357.402 C	23	70	19	59	287.4	-0.5	+13.7
358.421 G	3	18	4	21	286.1	-1.9	+13.6
Means ..	..	..	6	22	287.7	..	+13.9
Group 9593.							
December 18-28. Intermittent. Revival of Group 9585. A single small spot in a disturbed area on each of the days—December 18, 19, 24 and 28.							
352.510 G	1	6	1	6	246.1	0.0	+23.7
353.616 C	1	12	1	9	245.7	-0.1	+24.0
354.430 G	0	0	0	0	..	..	..
355.380 C	0	0	0	0	..	..	..
356.328 C	0	0	0	0	..	..	..
357.402 C	0	0	0	0	..	..	..
358.421 G	0	9	0	5	242.7	-1.9	+22.9
359.437 G	0	0	0	0	..	..	..
360.515 G	0	0	0	0	..	..	..
361.331 C	0	0	0	0	..	..	..
362.454 G	0	4	0	9	243.2	-0.5	+25.9
Means ..	..	..	0	3	244.4	..	+24.1
Group 9594.							
December 21-27. A stream of normal type developing with great rapidity and breaking up prematurely.							
355.380 C	51	283	27	155	271.8	0.0	-24.1
356.328 C	128	737	74	432	271.9	+0.3	-24.4
357.402 C	135	679	89	453	271.3	0.0	-24.7
358.421 G	97	516	79	423	270.4	-0.6	-24.8
359.437 G	51	307	60	356	271.3	+0.6	-24.7
360.515 G	15	109	38	274	271.8	+1.3	-25.0
361.331 C	1	11	3	36	265.6	..	-21.8
Means ..	..	..	61	349	271.4	..	-24.6

ROYAL OBSERVATORY, GREENWICH.

TOTAL AREAS OF SUN SPOTS AND FACULÆ

PROJECTED AND CORRECTED FOR FORESHORTENING

FOR EACH DAY,

AND

MEAN AREAS AND MEAN HELIOGRAPHIC LATITUDE

OF

SUN SPOTS AND FACULÆ

FOR EACH ROTATION OF THE SUN

AND FOR THE YEAR

1924.

TOTAL AREAS OF SUN SPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1924.

The Greenwich Civil Time at which the photograph was taken is expressed by the month, day of month (civil reckoning), and decimal of a day, reckoned from Greenwich Mean Midnight.

The place where the photograph was taken is indicated in the second column. A photograph taken at Greenwich is indicated by the letter G, and those taken at the Cape, Kodaikānal and Dehra Dūn, by the letters C, K and D respectively.

The Projected Area is the area as it is measured on the photograph, uncorrected for the effect of foreshortening and expressed in millionths of the Sun's apparent disc.

The Area Corrected for Foreshortening is expressed in millionths of the Sun's visible hemisphere.

Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.		
		Umbra.	Whole Spots.	Faculae.	Umbra.	Whole Spots.	Faculae.			Umbra.	Whole Spots.	Faculae.	Umbra.	Whole Spots.	Faculae.
1924	d							1924	d						
January	1.352	C	0	0	460	0	0	February	8.339	C	0	0	48	0	0
	2.167	D	0	0	442	0	0		9.371	C	0	0	0	0	0
	3.474	G	0	0	0	0	0		10.426	C	0	0	0	0	0
	4.518	C	0	0	111	0	0		11.345	C	0	0	0	0	0
	5.425	C	0	4	53	0	3		12.364	C	0	7	48	0	48
	6.357	C	2	6	95	2	5		13.374	C	0	0	93	0	87
	7.319	C	0	0	79	0	0		14.313	C	0	0	0	0	0
	8.487	C	0	0	95	0	0		15.407	G	3	10	0	2	6
	9.309	C	0	0	100	0	0		16.333	C	2	24	75	2	26
	10.459	C	0	0	195	0	0		17.561	G	0	0	0	0	0
	11.355	C	0	0	195	0	0		18.118	K	0	0	0	0	0
	12.338	C	0	0	61	0	0		19.328	C	0	0	0	0	0
	13.359	C	0	0	58	0	0		20.371	C	0	0	75	0	78
	14.361	C	0	0	58	0	0		21.356	C	0	0	43	0	58
	15.332	C	0	0	164	0	0		22.410	C	0	0	0	0	0
	16.449	G	0	0	272	0	0		23.504	G	0	0	32	0	56
	17.319	C	0	0	353	0	0		24.431	C	0	0	110	0	108
	18.398	C	0	0	194	0	0		25.430	C	43	230	123	30	160
	19.535	C	0	0	221	0	0		26.411	G	123	687	113	78	433
	20.432	G	0	0	0	0	0		27.321	C	127	782	0	78	480
	21.391	C	0	0	28	0	0		28.416	G	149	777	0	92	479
	22.343	C	0	0	21	0	0		29.484	G	92	548	0	62	365
	23.403	C	4	24	312	2	12	March	1.399	G	74	446	184	55	335
	24.320	C	0	0	437	0	0		2.429	G	63	283	270	60	273
	25.340	C	0	0	249	0	0		3.459	G	26	146	286	37	210
	26.324	C	2	20	265	1	16		4.410	G	15	56	189	42	158
	27.361	C	0	0	0	0	0		5.398	G	0	0	49	0	113
	28.443	C	2	8	228	4	16		6.609	G	0	0	59	0	67
	29.466	C	0	0	165	0	0		7.599	G	0	0	156	0	159
	30.328	C	0	0	143	0	0		8.498	G	0	0	151	0	143
	31.407	C	0	0	79	0	0		9.376	G	0	0	119	0	105
									10.398	G	0	0	0	0	0
February	1.457	G	0	0	139	0	0		11.401	G	0	0	0	0	0
	2.494	G	0	0	144	0	0		12.402	G	0	0	38	0	51
	3.485	G	2	19	198	2	17		13.398	G	0	0	0	0	0
	4.442	C	0	0	58	0	0		14.398	G	0	0	0	0	0
	5.346	C	0	0	37	0	0		15.608	G	0	0	76	0	65
	6.323	C	0	0	0	0	0		16.471	G	0	0	76	0	87
	7.327	C	0	0	52	0	0		17.403	G	0	0	0	0	0

TOTAL AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924—continued.

Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.				
		Umbra.	Whole Spots.	Facula.	Umbra.	Whole Spots.	Facula.			Umbra.	Whole Spots.	Facula.	Umbra.	Whole Spots.	Facula.		
1924 March	d							1924 May	d								
18.401	G	0	0	0	0	0	0	9.355	G	33	203	0	20	124	0		
19.408	G	0	0	0	0	0	0	10.457	G	39	168	112	24	103	144		
20.402	G	0	0	115	0	0	252	11.398	G	39	119	45	28	84	142		
21.326	C	4	10	228	2	5	334	12.382	G	92	349	677	66	258	894		
22.564	C	12	47	510	8	31	532	13.627	G	106	620	1063	70	385	1276		
23.370	C	6	22	453	4	15	426	14.352	G	112	676	798	65	394	876		
24.330	C	0	7	233	0	4	219	15.491	C	168	978	1349	92	528	1438		
25.513	C	0	0	236	0	0	220	16.348	C	180	1208	700	98	661	628		
26.110	K	0	0	0	0	0	0	17.354	G	172	931	265	103	584	221		
27.330	G	0	0	21	0	0	30	18.475	G	100	582	321	85	451	407		
28.325	C	0	0	108	0	0	126	19.351	G	60	434	744	56	399	847		
29.354	C	0	0	221	0	0	222	20.606	G	42	221	794	46	268	904		
30.401	G	0	0	300	0	0	277	21.353	G	39	213	455	32	282	548		
31.371	C	0	0	246	0	0	284	22.360	G	47	223	562	30	145	534		
								23.364	G	51	204	416	40	154	488		
								24.411	G	25	101	411	19	87	645		
April	1.609	G	0	0	109	0	0	147	25.461	G	10	18	237	6	10	342	
	2.486	G	0	0	83	0	0	140	26.352	G	6	10	269	4	6	258	
	3.536	G	0	0	111	0	0	197	27.382	C	21	95	517	11	53	411	
	4.337	C	0	0	20	0	0	29	28.359	G	16	87	243	11	61	246	
	5.426	G	0	0	0	0	0	0	29.364	G	10	74	367	74	450	485	
	6.607	G	0	12	0	0	7	0	30.378	G	61	373	265	127	969	562	
	7.409	G	0	0	0	0	0	0	31.450	C	86	734	579	111	946	693	
	8.342	C	0	0	0	0	0	0									
	9.610	G	0	0	0	0	0	0									
	10.329	C	0	5	0	0	3	0									
	11.346	C	0	0	0	0	0	0	June	1.446	C	119	962	714	107	872	710
	12.547	G	0	0	0	0	0	0	2.593	G	171	1223	135	124	889	181	
	13.407	G	0	0	0	0	0	0	3.422	G	243	1361	0	160	892	0	
	14.611	G	4	21	72	5	26	90	4.391	C	206	1685	135	123	1013	100	
	15.353	C	0	0	112	0	0	149	5.412	G	220	1827	175	130	1076	372	
	16.405	G	3	12	77	3	11	75	6.370	C	225	1837	542	135	1101	798	
	17.353	G	22	66	221	17	49	219	7.439	C	228	1526	568	149	989	589	
	18.303	G	110	469	116	71	308	126	8.303	G	154	1001	802	111	728	641	
	19.459	G	156	719	105	91	424	87	9.375	G	102	682	475	94	630	458	
	20.460	G	122	906	100	68	506	141	10.364	G	59	381	596	78	510	707	
	21.365	C	164	1077	105	90	592	122	11.585	G	26	191	698	73	562	1048	
	22.449	G	142	1067	83	79	603	74	12.360	G	8	49	499	5	29	769	
	23.510	C	128	726	199	80	446	145	13.375	C	31	160	327	23	90	267	
	24.353	C	104	720	254	75	514	226	14.467	G	58	323	176	34	182	128	
	25.479	G	72	512	477	70	488	561	15.387	G	76	424	443	47	264	372	
	26.328	C	29	223	448	44	338	725	16.345	G	59	295	516	43	221	556	
	27.339	G	8	59	411	18	133	704	17.570	G	53	253	539	54	256	691	
	28.354	G	3	12	56	2	8	214	18.506	G	30	144	579	36	180	687	
	29.303	G	0	0	106	0	0	105	19.397	G	24	105	430	25	116	600	
	30.372	C	0	0	156	0	0	208	20.583	G	31	154	307	20	108	422	
									21.360	G	27	186	85	16	120	114	
									22.395	G	32	146	80	19	90	145	
May	1.418	C	0	0	128	0	0	229	23.359	G	20	138	266	12	85	244	
	2.450	G	0	0	128	0	0	188	24.395	G	24	157	142	16	106	129	
	3.462	G	0	0	72	0	0	86	25.301	G	23	138	182	19	109	233	
	4.413	G	1	2	161	1	2	187	26.304	G	16	119	340	14	128	475	
	5.351	G	0	0	241	0	0	207	27.367	G	31	191	357	67	481	519	
	6.347	C	1	7	72	1	4	63	28.304	G	41	251	503	66	397	748	
	7.360	G	19	89	0	13	63	0	29.422	G	60	316	856	60	316	1144	
	8.450	G	34	281	0	21	179	0	30.421	G	49	346	591	39	271	619	

TOTAL AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924—continued.

Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.			
		Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.			Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.	
1924	d							1924	d							
July	1.368	G	73	440	767	57	331	664	August 24.229	D	43	269	655	28	176	612
	2.478	G	77	493	37	52	319	108	25.376	C	30	187	1058	26	165	1028
	3.435	G	102	482	80	60	284	126	26.358	C	8	107	624	10	140	750
	4.497	C	102	429	349	59	245	448	27.387	G	5	26	227	16	82	370
	5.368	G	113	544	618	64	306	807	28.331	C	51	204	378	71	271	851
	6.402	G	94	490	1096	83	471	1612	29.462	G	258	1345	306	165	821	321
	7.570	G	110	675	1924	115	719	1990	30.475	G	464	2159	525	253	1177	536
	8.308	G	121	736	2140	108	645	2051	31.564	G	473	2504	278	254	1343	371
	9.350	G	177	819	2326	127	611	2193								
	10.307	G	141	939	998	91	609	1136								
	11.349	G	226	1245	500	136	739	781	September 1.575	G	459	2524	446	256	1405	490
	12.306	G	271	1429	289	141	741	521	2.328	C	407	2423	1124	244	1461	1184
	13.367	C	233	1260	723	129	694	856	3.622	G	287	1968	1513	209	1451	1364
	14.306	G	192	1132	675	117	695	595	4.343	C	287	1539	999	155	1353	1073
	15.307	G	123	832	1111	91	619	1047	5.441	G	132	810	720	168	999	1034
	16.517	G	98	577	1305	99	583	1539	6.428	G	70	401	663	87	568	820
	17.305	G	59	362	1464	102	535	1859	7.233	D	48	248	940	40	208	774
	18.405	G	21	122	548	38	220	845	8.382	G	29	160	719	38	212	745
	19.374	G	0	43	299	0	209	408	9.437	G	6	62	1135	17	271	1348
	20.347	G	1	6	176	1	8	234	10.361	G	20	106	623	17	102	913
	21.453	G	15	57	306	10	39	238	11.412	G	59	412	570	39	277	795
	22.357	G	44	139	436	31	96	378	12.326	C	103	561	939	61	328	1108
	23.370	G	33	125	303	31	121	346	13.422	G	113	617	380	60	331	353
	24.364	G	38	162	266	21	90	383	14.378	G	81	432	0	42	225	0
	25.397	G	12	47	102	7	32	241	15.507	G	62	442	132	33	238	156
	26.392	G	24	78	671	22	73	903	16.377	G	23	168	317	13	97	423
	27.315	G	62	239	971	50	197	1040	17.340	C	31	180	320	21	124	386
	28.188	K	57	303	921	43	227	887	18.329	C	19	100	511	19	94	462
	29.369	G	70	336	1232	54	281	1320	19.321	C	31	129	578	33	138	706
	30.411	G	52	287	421	30	180	635	20.336	C	30	178	685	21	132	1160
	31.363	G	46	313	256	29	196	343	21.380	G	56	215	737	37	141	1014
									22.414	G	84	435	1935	51	262	1991
									23.648	G	52	396	1273	31	233	1108
August	1.383	C	73	514	596	81	524	812	24.393	G	58	338	940	50	339	880
	2.427	G	111	537	947	91	449	1207	25.366	C	58	282	154	50	241	194
	3.362	G	126	606	1725	113	530	1711	26.348	C	39	233	812	31	184	732
	4.387	G	134	608	2128	106	475	1973	27.420	G	24	160	1129	16	111	1418
	5.352	G	154	654	2033	107	451	1827	28.430	G	84	464	822	81	440	1221
	6.482	G	142	592	1880	92	408	1679	29.420	G	86	561	1336	64	435	1621
	7.615	G	111	602	404	57	308	473	30.425	G	70	388	1243	48	283	1236
	8.366	G	125	472	731	66	247	756								
	9.377	G	107	468	1203	63	277	1011								
	10.417	G	62	308	1085	44	221	997	October 1.362	C	87	528	1185	66	405	1283
	11.391	G	43	240	1398	41	226	1310	2.334	C	135	650	1374	88	431	1619
	12.373	G	37	183	688	52	270	811	3.452	G	115	639	595	92	583	728
	13.370	G	26	96	750	60	218	970	4.327	C	138	744	1101	113	780	1481
	14.399	G	15	65	800	23	100	1115	5.510	C	131	855	943	107	751	1103
	15.367	G	18	112	775	35	279	1215	6.413	G	164	883	1429	125	709	1640
	16.380	G	41	274	768	51	359	895	7.429	G	146	888	1120	104	638	1024
	17.609	G	75	441	224	60	357	179	8.627	G	144	897	843	100	632	757
	18.575	G	77	462	26	49	301	125	9.432	G	98	556	487	71	421	589
	19.394	G	107	515	222	61	298	276	10.405	G	63	353	246	47	306	378
	20.448	G	75	392	280	40	203	311	11.347	C	41	340	371	27	221	312
	21.379	G	64	346	78	33	176	104	12.369	C	46	282	567	34	206	484
	22.363	G	57	281	179	30	149	270	13.447	G	31	224	1223	57	461	1438
	23.416	G	54	291	301	31	169	365	14.467	G	61	366	1747	98	605	2144

TOTAL AREAS OF SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1924—*continued.*

Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Civil Time.	Place.	Projected Area.			Area Corrected for Foreshortening.		
		Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.			Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.
1924	d							1924	d						
October 15.368	C	116	587	971	130	651	1226	November 23.365	C	406	2756	1120	233	1595	1117
16.339	C	125	747	1207	95	562	1478	24.496	C	268	2090	254	162	1262	302
17.339	C	131	896	652	82	559	900	25.308	C	255	1880	0	179	1272	0
18.405	G	152	1005	846	84	553	1043	26.327	C	244	1630	668	205	1463	668
19.383	C	143	988	360	76	523	392	27.527	G	175	1119	1032	207	1763	1383
20.352	C	166	1051	824	88	556	936	28.508	G	73	575	884	63	689	941
21.319	C	157	797	1139	88	444	1218	29.322	C	56	416	1038	56	416	1290
22.620	G	99	736	152	62	463	126	30.369	C	29	206	1098	47	337	1437
23.438	G	108	658	174	79	488	262								
24.509	C	110	470	1275	114	480	1290								
25.322	C	55	367	1265	69	579	1579								
26.357	C	96	467	864	99	659	1479	December 1.446	G	13	51	1049	62	244	1422
27.393	G	107	447	238	62	263	235	2.404	C	0	0	328	0	0	507
28.516	G	79	394	745	45	228	656	3.493	C	16	95	503	9	53	484
29.323	C	57	244	614	33	143	759	4.405	C	6	25	535	4	16	449
30.368	C	31	188	575	20	123	755	5.480	G	0	9	69	0	7	83
31.549	C	21	96	829	21	102	898	6.500	G	0	0	117	0	0	112
								7.373	C	14	111	456	25	200	732
								8.349	C	23	149	541	25	156	614
								9.437	G	33	160	512	28	130	501
November 1.411	C	8	61	897	10	75	1157	10.321	C	47	249	544	35	180	538
2.415	C	5	31	811	8	58	1201	11.329	C	55	361	564	34	227	570
3.413	G	0	0	701	0	0	806	12.353	C	63	259	606	55	254	1071
4.472	G	0	0	988	0	0	904	13.313	C	81	351	633	93	359	934
5.359	C	1	7	696	1	4	721	14.468	G	70	368	1140	57	304	1335
6.398	G	0	0	446	0	0	420	15.341	C	69	368	1441	52	274	1721
7.330	C	2	21	139	1	11	228	16.335	C	55	322	1240	35	206	1405
8.396	C	0	0	257	0	0	200	17.315	C	55	270	1557	32	155	1635
9.406	G	0	0	304	0	0	368	18.510	G	67	357	1096	37	196	1315
10.331	C	0	0	829	0	0	898	19.616	C	52	417	1107	30	232	1170
11.403	G	8	25	780	8	24	978	20.430	G	77	363	1078	45	208	1104
12.255	D	13	49	1361	9	35	1373	21.380	C	87	466	47	49	271	83
13.447	C	0	0	1091	0	0	1251	22.328	C	156	886	1255	95	537	1025
14.310	C	29	119	319	17	69	508	23.402	C	188	874	1118	128	592	1128
15.316	C	55	291	480	79	617	687	24.421	G	100	558	1549	83	460	1650
16.608	C	63	687	498	61	669	581	25.437	G	51	307	1160	60	356	1588
17.424	G	193	896	637	151	684	733	26.515	G	15	109	1283	38	274	1797
18.321	C	173	1058	952	164	1092	1306	27.331	C	1	11	928	3	36	1555
19.343	C	230	1406	964	184	1280	1447	28.454	G	0	4	1320	0	9	1575
20.327	C	267	1746	1343	192	1277	1282	29.430	G	0	7	897	0	6	853
21.406	C	375	2392	1284	231	1463	1416	30.360	C	0	0	432	0	0	590
22.308	C	375	2576	708	214	1490	910	31.335	C	2	24	132	2	18	152

MEAN AREAS of SUN SPOTS and FACULÆ for each ROTATION of the SUN, from 1923 December 25 to 1925 January 9.

The Mean Areas have been formed by taking the means of the Areas for each day of observation throughout each Rotation of the Sun, the Projected Areas being the Areas as measured on the photographs and expressed in millionths of the Sun's apparent disc, and the Areas Corrected for Foreshortening being expressed in millionths of the Sun's visible hemisphere.

The Rotations adopted in the following table (which is in continuation of those for the years 1873-1923 printed in the Greenwich Observations for 1884 and succeeding years) correspond to the synodic rotation of the Sun, and the commencement of each is defined by the coincidence of the assumed prime meridian with the central meridian, the assumed prime meridian being that meridian which passed through the ascending node at mean noon on January 1, 1854, and the assumed period of the Sun's sidereal rotation being 25.38 days. The numeration of the rotations is in continuation of Carrington's series (*Observations of Solar Spots made at Redhill* by R. C. Carrington, F.R.S.), No. 1 being the rotation commencing 1853 November 9. The dates of commencement of the rotations are given in Greenwich Civil Time, reckoning from midnight.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
			Projected.			Corrected for Foreshortening.		
			Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.
940	1923 December 25.41 ^d	28	1	6	179	1	6	218
941	1924 January 21.75	27	1	4	103	$\frac{1}{2}$	4	116
942	February 18.09	27	26	146	77	20	107	90
943	March 16.42	28	1	4	110	$\frac{1}{2}$	2	126
944	April 12.71	27	43	266	145	28	178	183
945	May 9.95	27	90	573	457	68	445	532
946	June 6.16	27	61	387	433	51	323	514
947	July 3.36	28	93	496	804	66	367	908
948	" 30.57	27	73	368	808	55	284	856
949	August 26.80	27	137	754	656	90	523	769
950	September 23.06	27	94	565	925	73	454	1053
951	October 20.35	28	45	257	689	35	218	803
952	November 16.65	27	129	836	683	98	663	824
953	December 13.97	27	40	216	810	28	157	946

MEAN AREAS of SUN SPOTS and FACULÆ for the YEAR 1924.

The Mean Projected Areas are expressed in millionths of the Sun's apparent disc.

The Mean Areas Corrected for Foreshortening are expressed in millionths of the Sun's visible hemisphere.

Year.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
		Projected.			Corrected for Foreshortening.		
		Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.
1924	366	62	361	498	46	276	575

MEAN HELIOGRAPHIC LATITUDE of SUN SPOTS for each ROTATION of the SUN, from 1923 December 25 to 1925 January 9.

The numbers given in the accompanying table have been formed as follows :—

The Heliographic Latitude of each Spot for each day has been multiplied by its Area (corrected for foreshortening), and the sum of the products, for Spots North of the Equator, has been divided by the sum of the corresponding Areas to form Mean Heliographic Latitude of Spotted Area North of Equator ; similarly for Spots South of the Equator. In forming the Mean Heliographic Latitude of entire Spotted Area, the algebraic sum of the products for Spots North and South of the Equator has been divided by the sum of the Areas ; and for the Mean Distance from the Equator for all Spots, the numerical sum of the products, without regard to the sign of the latitude, has been similarly divided.

The Mean Areas have been formed by dividing the sum of the Daily Areas (corrected for foreshortening) by the number of days of observation for each Rotation of the Sun, and are expressed in millionths of the Sun's visible hemisphere.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of entire Spotted Area.	Mean Distance from Equator of all Spots.
			Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
940	1923 December 25 ^d 41	28	6	28.03	0	—	+ 28.03	28.03
941	1924 January 21.75	27	2	26.60	2	20.09	+ 1.85	23.15
942	February 18.09	27	107	27.30	0.4	15.5	+ 27.14	27.26
943	March 16.42	28	1	20.19	1	26.03	— 0.43	22.80
944	April 12.71	27	36	25.78	142	28.17	— 17.28	27.69
945	May 9.95	27	285	31.48	161	21.70	+ 12.29	27.95
946	June 6.16	27	309	30.60	14	24.92	+ 28.28	30.36
947	July 3.36	28	362	19.20	5	24.86	+ 18.56	19.28
948	" 30.57	27	275	15.32	9	23.80	+ 14.11	15.58
949	August 26.80	27	494	18.67	29	25.24	+ 16.28	19.03
950	September 23.06	27	295	20.84	159	27.83	+ 3.75	23.29
951	October 20.35	28	216	21.66	2	25.86	+ 21.27	21.69
952	November 16.65	27	663	21.35	1	23.05	+ 21.33	21.36
953	December 13.97	27	74	20.77	83	24.24	— 3.08	22.61

MEAN HELIOGRAPHIC LATITUDE of SUN SPOTS for the YEAR 1924.

Year.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of entire Spotted Area.	Mean Distance from Equator of all Spots.
		Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
1924	366	232	22.19	45	25.54	+ 14.49	22.73

ROYAL OBSERVATORY, GREENWICH.

DETERMINATION OF THE SOLAR ROTATION
FROM LONG-LIVED SPOTS

AND

CHARACTERISTIC MOVEMENTS
OF SUNSPOTS

DERIVED FROM THE GREENWICH SUNSPOT MEASURES
FOR THE FOUR SOLAR CYCLES, 1878-1923.

DETERMINATION OF THE SOLAR ROTATION FROM LONG-LIVED SPOTS.

The measurement of Sun Spots at Greenwich has been carried on for four complete cycles. The present seems a fitting opportunity for a rediscussion of these measures for determination of the Solar Rotation. For this purpose the most valuable material is given by the spots which have been seen in two or more consecutive rotations of the sun. Instead of using spot-groups, *i.e.*, the mean of a number of allied spots, long-lived single spots have been chosen. Such spots are usually leaders of groups of spots and of regular form which makes them very suitable for measurement.

The measures of these spots have been extracted, with the help of the *Catalogue of Recurrent Groups of Spots*,* from the *Daily Results* since 1878, and collected in the form in which they have been published in the *Ledgers* since 1916. The method of reduction is very simple; the mean position of the spot for the days when visible at its first appearance (excluding days when the spot is more than 75° from the central meridian) is compared with the corresponding mean position after its re-appearance. If the change of longitude be x° in the interval of y days, then the angular movement of the spot is x°/y per mean solar day relative to a meridian on the Sun having a sidereal rotation of period 25.38 days or a daily movement of $14^\circ.18$, this being the datum adopted in the *Nautical Almanac* for the computation of the longitude of the central meridian as seen from the Earth. Thus the sidereal angular motion of the spot per mean solar day is $14^\circ.18 + x^\circ/y$.

In the following table, the first four columns give the numbers of the groups containing the spot during its two successive appearances on the Sun's disc, together with a letter by which it can be easily identified amongst the measures of the components of the group. *l* indicates that it is the leading spot of the group; *f*, the follower; *p*, the principal component; *g*, the sole component of the group. Where a distinctive letter, such as *a*, *b*, or *c*, has been given in the *Daily Results* or the *Ledgers*, it is also given in columns two and four. The sixth and seventh columns give the mean longitude respectively in the first and second rotations derived from the measures collected from the *Daily Results* from 1878–1915 or appearing in the *Ledgers* from 1916 to 1923. The mean date, given in the eighth and ninth columns, is expressed in days and decimal of a day, reckoning from midnight at the commencement of the year. Columns ten and eleven give the differences of longitude and interval in days.

* Appendix to Greenwich Photo-Heliographic Results, 1907 and in subsequent volumes up to 1915.

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1878—1879. No suitable spots.												
Year 1880.												
321	g	327	p	+25.3	89.04	84.32	127.9	152.4	— 4.72	24.5	— .19	13.99
342	l	351	g	+11.1	325.25	327.30	219.3	245.9	+ 2.05	26.6	+ .08	14.26
343	g	354	p	+24.7	235.12	230.41	225.9	252.4	— 4.71	26.5	— .18	14.00
348	l	359	p	+22.4	190.98	190.03	232.8	256.0	— 0.95	23.2	— .04	14.14
397	l	403	g	+20.6	256.09	250.00	333.3	360.8	— 6.09	27.5	— .22	13.96
Year 1881.												
408	l	419	g	+16.5	354.02	354.02	18.3	41.8	0.00	23.5	.00	14.18
410D	l	424	g	—19.0	239.16	240.14	26.2	50.8	+ 0.98	24.6	+ .04	14.22
433	l	451	g	+21.3	342.14	335.62	71.9	97.4	— 6.52	25.5	— .25	13.93
436	l	453	g	—15.1	270.58	271.14	76.4	102.8	+ 0.56	26.4	+ .02	14.20
453	g	471	p	—14.2	271.14	270.36	102.8	126.4	— 0.78	23.6	— .03	14.15
461	l	474	g	+ 6.8	152.93	167.15	112.3	133.8	+14.22	21.5	+ .66	14.84
526	g	549	p	+27.8	307.22	293.17	208.8	237.4	—14.05	28.6	— .49	13.69
552	p	574	g	+14.6	266.20	263.47	240.3	265.9	— 2.73	25.6	— .11	14.07
553	l	575	g	+20.6	263.77	257.26	241.3	267.9	— 6.51	26.6	— .24	13.94
561	l	577	g	—25.0	180.02	173.08	245.8	271.0	— 6.94	25.2	— .27	13.91
566	l	582	g	+12.5	102.90	102.48	253.4	275.4	— 0.42	22.0	— .02	14.16
586	p	598	g	+14.2	39.18	41.45	283.8	310.8	+ 2.27	27.0	+ .08	14.26
589	g	603	p	+16.4	289.10	286.81	291.9	319.9	— 2.29	28.0	— .08	14.10
594	p	605	p	+21.8	248.23	251.20	297.3	318.9	+ 2.97	21.6	+ .14	14.32
603	p	625	g	+16.6	286.81	282.00	319.9	345.9	— 4.81	26.0	— .18	14.00
606	l	628	g	+16.9	237.00	238.34	323.7	350.4	+ 1.34	26.7	+ .05	14.23
Year 1882.												
642	l	658	p	+16.2	12.03	18.78	6.3	29.7	+ 6.75	23.4	+ .29	14.47
653	g	677	l	—17.9	97.75	104.52	23.3	47.0	+ 6.77	23.7	+ .28	14.46
664	l	687	f	—13.8	291.40	293.27	39.9	63.3	+ 1.87	23.4	+ .08	14.26
672	l	699	l	—18.5	137.69	135.20	47.9	72.4	— 2.49	24.5	— .10	14.08
691	g	718	g	+ 0.3	221.78	224.63	68.8	95.9	+ 2.85	27.1	+ .11	14.29
693	l	713	g	+24.4	270.20	267.14	68.4	90.9	— 3.06	22.5	— .13	14.05
702	l	732	g	—22.2	75.72	72.40	79.9	105.5	— 3.32	25.6	— .13	14.05
705	p	735	g	—10.4	3.01	6.77	85.3	112.4	+ 3.76	27.1	+ .14	14.32
722	g	749	p	+20.8	160.78	155.36	100.9	126.9	— 5.42	26.0	— .21	13.97
744	g	767	g	+22.1	176.78	168.32	126.9	154.4	— 8.46	27.5	— .31	13.87
785	l	806	p	+10.0	198.72	199.34	181.4	203.4	+ 0.62	22.0	+ .03	14.21
797	l	812	g	+14.8	293.25	296.74	199.9	225.9	+ 3.49	26.0	+ .13	14.31
808	l	821	g	—11.5	127.55	128.69	214.9	239.4	+ 1.14	24.5	+ .04	14.22
838	l	856	g	+11.8	201.67	203.19	260.7	288.3	+ 1.52	27.6	+ .05	14.23
846	g	868	g	—22.0	50.18	43.26	271.9	299.9	— 6.92	28.0	— .25	13.93
868	g	890	g	—22.6	43.26	36.12	299.9	328.4	— 7.14	28.5	— .25	13.93
870	l	895	g	+15.9	334.31	330.78	305.9	331.4	— 3.53	25.5	— .14	14.04
885	g	908	l	+18.9	120.97	119.33	321.8	344.8	— 1.64	23.0	— .07	14.11

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1883.												
927	g	946	g	-18.6	213.87	211.04	4.7	29.8	-2.83	25.1	-1.11	14.07
987	l	1011	l	+13.1	135.56	142.41	92.4	116.4	+6.85	24.0	+1.28	14.46
999	l	1027	g	-22.1	307.61	300.90	106.8	134.8	-6.71	28.0	-1.24	13.94
1000	p	1026	g	-15.7	303.70	303.15	106.8	130.9	-0.55	24.1	-0.02	14.16
1071	p	1094	p	-10.3	176.04	178.02	196.6	224.9	+1.98	28.3	+0.07	14.25
1109	g	1126	g	-18.8	253.95	249.48	246.9	274.4	-4.47	27.5	-1.16	14.02
1114	g	1133	g	-22.1	132.79	128.78	255.9	283.4	-4.01	27.5	-1.15	14.03
1133	g	1169	g	-22.8	128.78	118.66	283.4	311.4	-10.12	28.0	-1.36	13.82
1144	g	1173	l	-9.5	35.18	36.80	290.9	317.9	+1.62	27.0	+0.06	14.24
1173	l	1198	p	-9.6	36.80	34.65	317.9	345.4	-2.15	27.5	-0.08	14.10
1177	p	1206	p	-15.0	332.45	331.16	322.9	347.4	-1.29	24.5	-0.05	14.13
1216	l	1255	g	-8.4	206.04	208.21	358.3	386.8	+2.17	28.5	+0.07	14.25
1217	p	1256	g	+1.5	199.58	203.36	358.3	386.8	+3.78	28.5	+1.13	14.31
Year 1884.												
1267	p.a	1303	l.a	-25.4	27.66	19.61	35.8	63.9	-8.05	28.1	-1.28	13.90
1284	p	1320	g	-9.5	207.39	208.31	48.9	76.4	+0.92	27.5	+0.03	14.21
1288	l	1323	g	+13.4	178.68	188.52	51.3	78.4	+9.84	27.1	+1.36	14.54
1324	p.a	1358	p.a	+7.8	180.37	182.59	78.9	104.8	+2.22	25.9	+0.09	14.27
1330	l.a	1360	g	-8.9	122.49	129.32	82.9	108.9	+6.83	26.0	+1.26	14.44
1371	l.a	1393	g	-9.5	26.95	28.88	116.9	144.3	+1.93	27.4	+0.07	14.25
1381	p.a	1409	l.a	-7.1	153.17	152.32	134.8	162.3	-0.85	27.5	-0.03	14.15
1388	p.a	1410	g	-2.3	74.87	79.73	140.8	164.8	+4.86	24.0	+1.20	14.38
1393	g	1414	g	-8.8	28.88	31.55	144.3	170.9	+2.67	26.6	+1.10	14.28
1409	l.a	1425	g	-6.9	152.32	151.25	162.3	188.9	-1.07	26.6	-0.04	14.14
1438	l.a	1455	p.a	-3.1	317.05	323.44	206.9	230.9	+6.39	24.0	+1.26	14.44
1480	l.a	1501	l.a	+14.2	21.04	19.15	256.9	281.4	-1.89	24.5	-0.08	14.10
1480	f.b	1501	f.b	+14.2	10.88	10.50	257.4	277.4	-0.38	20.0	-0.02	14.16
1495	g	1518	g	-13.9	133.93	132.64	272.4	297.9	-1.29	25.5	-0.05	14.13
1532	l.a	1548	g	-7.1	302.74	307.10	317.3	339.3	+4.36	22.0	+1.20	14.38
1546	l.a	1563	p.a	+2.4	353.19	355.88	339.8	364.7	+2.69	24.9	+1.11	14.29
Year 1885.												
1632	l.a	1647	p.a	-16.3	243.54	243.08	93.4	116.9	-0.46	23.5	-0.02	14.16
1706	p.a	1720	p.b	+9.7	244.31	245.72	169.8	198.5	+1.41	28.7	+0.05	14.23
1718	p.a	1737	p.a	-9.6	292.79	297.54	195.0	221.9	+4.75	26.9	+1.18	14.36
1728	p.a	1748	g	-12.7	175.00	173.17	203.5	230.9	-1.83	27.4	-0.06	14.12
1738	l.a	1759	p.a	-11.9	289.34	293.34	222.4	249.4	+4.00	27.0	+1.15	14.33
1756	l	1767	g	-3.2	24.34	28.47	245.4	269.4	+4.13	24.0	+1.17	14.35
1773	l.a	1788	p.a	-15.5	263.10	260.51	278.8	306.2	-2.59	27.4	-0.09	14.09
Year 1886.												
1828	l.a	1835	p.a	-9.9	32.53	35.31	15.4	40.3	+2.78	24.9	+1.11	14.29
1835	p.a	1852	p.a	-9.0	35.31	35.70	40.3	67.4	+0.39	27.1	+0.01	14.19
1853	l.a	1864	p.a	-5.3	23.47	26.75	68.4	96.4	+3.28	28.0	+1.12	14.30
1856	l.a	1869	g	+4.7	199.85	201.68	82.4	109.9	+1.83	27.5	+0.06	14.24
1860	l.a	1874	p.a	-17.5	119.37	117.65	90.4	115.9	-1.72	25.5	-0.07	14.11

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1886.— <i>contd.</i>												
1864	p.a	1876	g	— 6.0	26.75	32.30	96.4	122.4	+ 5.55	26.0	+ .21	14.39
1878	l.a	1884	g	—10.9	72.88	74.25	122.4	146.4	+ 1.37	24.0	+ .05	14.23
1884	g	1897	g	—11.1	74.25	74.06	146.4	173.4	— 0.19	27.0	— .01	14.17
1891	l.a	1901	p.a	—14.9	304.61	301.99	157.9	183.4	— 2.62	25.5	— .10	14.08
1901	p.a	1910	p.a	—14.2	301.99	300.50	183.4	211.4	— 1.49	28.0	— .05	14.13
1906	l.a	1915	p.a	— 9.0	76.06	78.90	201.8	226.9	+ 2.84	25.1	+ .11	14.29
Year 1887.												
1987	p.a	1992	p.a	— 7.8	94.93	97.18	161.9	188.4	+ 2.25	26.5	+ .08	14.26
1991	p.a	1996	p.a	—12.4	179.29	182.34	182.4	206.4	+ 3.05	24.0	+ .13	14.31
1992	p.a	1998	g	— 7.4	97.18	97.53	188.4	215.4	+ 1.35	27.0	+ .01	14.19
Year 1888. No suitable spots.												
Year 1889.												
2085	l.a	2086	g	+ 5.8	312.67	315.14	73.4	95.4	+ 2.47	22.0	+ .11	14.29
2090	l.a	2092	p.a	— 6.8	31.13	36.29	172.4	198.9	+ 5.16	26.5	+ .19	14.37
2092	p.a	2099	g	— 8.1	36.29	36.91	198.9	225.9	+ 0.62	27.0	+ .02	14.20
2097	l.a	2100	g	—19.8	164.72	160.38	218.9	243.9	— 4.34	25.0	— .17	14.01
Year 1890.												
2159	l.a	2165	l.a	+20.4	311.40	310.10	331.9	353.9	— 1.30	22.0	— .06	14.12
Year 1891.												
2183	l.a	2193	g	+19.6	280.31	284.54	51.4	77.9	+ 4.23	26.5	+ .16	14.34
2204	l.a	2220	g	—19.5	137.30	135.48	115.9	143.4	— 1.82	27.5	— .06	14.12
2247	l.a	2266	p.a	—21.9	37.39	29.62	178.9	202.9	— 7.77	24.0	— .32	13.86
2294	l.a	2311	p.a	+26.2	178.03	170.43	248.9	276.9	— 7.60	28.0	— .27	13.91
2299	p.a	2318	p.a	+14.4	51.69	53.66	258.9	285.9	+ 1.97	27.0	+ .07	14.25
2349	l.a	2364	g	—19.7	265.44	267.67	324.4	351.9	+ 2.23	27.5	+ .08	14.26
Year 1892.												
2376	l.a	2411	p.a	+21.6	39.88	45.56	3.4	28.4	+ 5.68	25.0	+ .22	14.40
2405	p.a	2431	p.a	+19.0	148.77	144.39	22.9	50.9	— 4.38	28.0	— .15	14.03
2448	p.a	2481	p.a	+10.5	105.95	106.73	80.9	107.9	+ 0.78	27.0	+ .03	14.21
2481	p.a	2512	p.a	+10.8	106.73	107.83	107.9	132.4	+ 1.10	24.5	+ .04	14.22
2492	p.a	2528	g	—17.6	313.77	313.11	119.9	144.9	— 0.66	25.0	— .03	14.15
2507	p.a	2545	p.a	+18.6	166.89	163.13	130.9	155.9	— 3.76	25.0	— .15	14.03
2530	l.a	2562	l.a	+11.1	2.46	359.94	144.9	167.9	— 2.52	23.0	— .11	14.07
2550	p.a	2581	l.a	+10.4	85.27	89.60	163.4	191.4	+ 4.33	28.0	+ .15	14.33
2560	f.a	2583	p.a	—31.3	46.98	32.96	168.4	194.9	—14.02	26.5	— .53	13.65
2580	l.a	2612	g	—22.4	98.51	91.18	189.9	217.9	— 7.33	28.0	— .26	13.92

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1892. <i>contd.</i> —												
2581	1.a	2611	p.d	+11.4	89.60	93.18	191.4	218.4	+ 3.58	27.0	+ .13	14.31
2583	p.a	2615	p.a	—30.8	32.96	16.58	194.9	222.9	—16.38	28.0	— .58	13.60
2586	1.a	2623	g	— 8.2	302.04	303.22	201.9	228.9	+ 1.18	27.0	+ .04	14.22
2598	1.a	2636	p.a	+12.7	176.14	173.73	211.4	238.9	— 2.41	27.5	— .09	14.09
2611	p.d	2643	p.a	+10.6	93.18	93.14	218.4	244.9	— 0.04	26.5	.00	14.18
2612	g	2644	p.a	—22.4	91.18	81.88	217.9	245.9	— 9.30	28.0	— .33	13.85
2643	p.a	2675	p.a	+10.4	93.14	91.53	244.9	272.4	— 1.61	27.5	— .06	14.12
2726	1.a	2760	p.a	+ 7.5	290.76	291.45	310.4	338.9	+ 0.69	28.5	+ .02	14.20
2730	1.a	2759	g	+19.8	296.36	292.94	313.4	337.9	— 3.42	24.5	— .14	14.04
2749	p.a	2787	1.a	—15.6	6.69	7.41	333.4	360.9	+ 0.72	27.5	+ .02	14.20
2773	1.a	2794	g	—11.6	264.32	271.59	342.4	365.9	+ 7.27	23.5	+ .31	14.49
Year 1893.												
2853	1.a	2889	p.a	+14.8	303.98	304.26	53.9	80.4	+ 0.28	26.5	+ .01	14.19
2881	1.a	2914	1.a	— 7.9	42.64	50.08	73.9	100.4	+ 7.44	26.5	+ .28	14.46
2893	p.a	2930	p.a	+24.1	274.96	268.53	83.9	109.9	— 6.43	26.0	— .25	13.93
2906	p.a	2939	p.a	—14.3	182.29	190.02	90.9	116.9	+ 7.73	26.0	+ .30	14.48
2919	1.a	2956	1.a	—27.7	57.71	50.43	101.4	128.4	— 7.28	27.0	— .27	13.91
2923	1.a	2964	p.a	—13.7	331.87	331.04	106.9	132.9	— 0.83	26.0	— .03	14.15
2951	p.a	2992	1.a	—20.1	93.77	91.05	124.9	151.9	— 2.72	27.0	— .10	14.08
2993	1.a	3034	1.a	—20.0	79.68	77.36	152.9	177.4	— 2.32	24.5	— .09	14.09
3005	p.a	3047	g	—12.2	321.73	322.38	161.9	188.9	+ 0.65	27.0	+ .02	14.20
3015	1.c	3054	1.a	—20.2	288.43	284.03	168.9	191.9	— 4.40	23.0	— .19	13.99
3020	f.c	3071	p.a	+17.3	220.32	217.30	172.4	196.9	— 3.02	24.5	— .12	14.06
3054	1.a	3110	g	—21.4	284.03	278.00	191.9	215.9	— 6.03	24.0	— .25	13.93
3059	1.a	3098	p.a	+10.9	318.30	322.53	190.9	216.4	+ 4.23	25.5	+ .17	14.35
3067	1.a	3112	p.a	+16.9	251.63	245.24	194.4	220.9	— 6.39	26.5	— .24	13.94
3078	p.a	3185	1.a	—20.2	108.63	103.07	204.9	232.4	— 5.56	27.5	— .20	13.98
3106	1.a	3156	p.a	—19.1	296.39	292.08	218.9	245.9	— 4.31	27.0	— .16	14.02
3107	1.a	3155	p.a	+14.0	301.51	301.85	219.9	244.9	+ 0.34	25.0	+ .01	14.19
3154	1.a	3202	p.a	—11.1	307.04	305.59	244.9	271.9	— 1.45	27.0	— .05	14.13
3155	p.a	3203	p.a	+13.5	301.85	300.65	244.9	272.4	— 1.20	27.5	— .04	14.14
3173	1.a	3216	g	— 8.1	170.54	176.17	254.9	281.9	+ 5.63	27.0	+ .21	14.39
3203	p.a	3250	p.a	+13.4	300.65	298.28	272.4	299.9	— 2.37	27.5	— .08	14.10
3206	1.c	3246	1.a	+ 9.1	326.12	335.01	273.4	294.9	+ 8.89	21.5	+ .41	14.59
3227	p.a	3266	g	+23.0	85.73	80.60	288.9	311.9	— 5.13	23.0	— .22	13.96
3287	1.a	3304	g	+19.0	334.58	334.94	325.9	350.9	+ 0.36	25.0	+ .01	14.19
3305	g	3352	g	— 1.4	330.12	335.93	351.9	378.9	+ 5.81	27.0	+ .21	14.39
3318	1.a	3367	p.a	— 3.0	225.00	234.05	358.9	387.4	+ 9.05	28.5	+ .32	14.50
3323	1.a	3370	g	—10.2	197.08	201.61	361.9	386.4	+ 4.53	24.5	+ .18	14.36
3325	p.a	3372	1.a	— 7.2	168.72	173.82	364.4	391.9	+ 5.10	27.5	+ .18	14.36
Year 1894.												
3356	1.a	3396	1.a	+11.5	309.73	309.60	15.9	42.9	— 0.13	27.0	.00	14.18
3360	1.a	3401	g	—14.8	268.03	267.56	18.9	46.9	— 0.47	28.0	— .02	14.16
3371	1.a	3402	p.a	+16.2	264.52	265.40	22.4	46.9	+ 0.88	24.5	+ .03	14.21
3402	p.a	3443	g	+16.9	265.40	263.98	46.9	73.4	— 1.42	26.5	— .05	14.13
3414	1.a	3442	p.a	— 4.4	262.03	270.63	50.9	73.9	+ 8.60	23.0	+ .37	14.55
3413	p.a	3449	p.a	—25.8	152.24	143.30	54.9	79.9	— 8.94	25.0	— .36	13.82
3460	1.a	3492	p.a	+10.9	54.75	54.94	90.4	116.9	+ 0.19	26.5	+ .01	14.19

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
				°	°	°			°			
Year 1894.—contd.												
3465	p.a	3495	g	+15.1	21.81	19.68	91.9	118.4	- 2.13	26.5	- .08	14.10
3533	p.a	3581	p.a	+12.8	357.05	359.54	148.9	175.9	+ 2.49	27.0	+ .09	14.27
3537	p.a	3585	p.a	+15.7	314.54	315.87	151.9	178.9	+ 1.33	27.0	+ .05	14.23
3546	l.a	3583	p.a	- 1.0	343.60	348.34	152.9	175.9	+ 4.74	23.0	+ .20	14.38
3575	l.a	3624	l.a+b	-13.3	77.21	76.71	169.9	196.9	- 0.50	27.0	- .02	14.16
3581	p.a	3637	l.a	+13.1	359.54	359.57	175.9	202.9	+ 0.03	27.0	.00	14.18
3599	l.a	3652	l.a	+11.9	188.78	192.48	188.9	213.9	+ 3.70	25.0	+ .15	14.33
3604	f.c	3654	p.a	-19.3	167.43	162.40	189.9	214.9	- 5.03	25.0	- .20	13.98
3640	l.a	3674	p.a	- 7.2	329.83	336.38	205.9	230.9	+ 6.55	25.0	+ .26	14.44
3642	p.a	3679	g.	+18.2	300.98	297.94	206.9	232.9	- 3.04	26.0	- .11	14.07
3702	g	3734	p.a	+17.1	42.00	41.02	253.9	281.9	- 0.98	28.0	- .04	14.14
3732	p.a	3776	g	+12.7	56.43	54.43	280.9	306.9	- 2.00	26.0	- .08	14.10
3817	l.a	3836	p.a	-14.0	34.18	31.75	338.4	362.9	- 2.43	24.5	- .10	14.08
Year 1895.												
3847	p.a	3883	p.a	-18.3	307.52	301.00	5.4	31.9	- 6.52	26.5	- .24	13.94
3884	l.a	3916	p.a	+13.8	304.95	308.79	32.9	59.9	+ 3.84	27.0	+ .14	14.32
3916	p.a	3955	g	+12.8	308.79	307.40	59.9	84.4	- 1.39	24.5	- .06	14.12
3933	p.a	3964	g	+13.0	183.63	184.01	69.9	95.9	+ 0.38	26.0	+ .01	14.19
3968	p.a	4005	l.a	-13.6	134.53	141.38	100.9	127.9	+ 6.85	27.0	+ .25	14.43
3989	l.a	4024	p.a	+23.0	303.57	299.61	114.9	142.9	- 3.96	28.0	- .14	14.04
3996	l.a	4025	g	-12.8	297.60	298.44	118.4	141.9	+ 0.84	23.5	+ .03	14.21
4028	l.a	4061	p.a	-23.9	275.42	273.39	144.9	170.9	- 2.03	26.0	- .08	14.10
4049	p.a	4077	p.a	-18.2	82.06	76.85	158.9	186.4	- 5.21	27.5	- .19	13.99
4084	l.a	4112	p.a	- 6.4	1.61	3.12	192.9	219.4	+ 1.51	26.5	+ .05	14.23
4107	l.a	4133	p.a	- 8.7	79.28	79.33	214.9	240.9	+ 0.05	26.0	.00	14.18
4110	l.a	4139	p.a	+10.8	27.53	27.70	219.4	244.9	+ 0.17	25.5	+ .01	14.19
4139	p.a	4180	p.a	+11.2	27.70	26.12	244.9	272.4	- 1.58	27.5	- .06	14.12
4208	l.a	4229	p.a	+19.0	360.15	359.95	302.4	327.4	- 0.20	25.0	- .01	14.17
4210	l.a	4230	p.a	+ 9.5	328.06	331.31	305.9	328.9	+ 3.25	23.0	+ .14	14.32
4211	l.a	4231	p.b	+11.6	292.96	297.06	306.9	333.4	+ 4.10	26.5	+ .15	14.33
4234	l.a	4256	l.a	-13.4	304.78	305.52	336.9	360.9	+ 0.74	24.0	+ .03	14.21
4255	l.a	4277	p.a	-10.5	322.18	323.69	358.9	386.4	+ 1.51	27.5	+ .05	14.23
4256	l.a	4278	p.a	-13.8	305.52	303.97	360.9	387.9	- 1.55	27.0	- .06	14.12
Year 1896.												
4305	l.a	4320	p.a	-15.9	156.02	160.07	64.4	85.4	+ 4.05	21.0	+ .19	14.37
4369	l.a	4386	p.a	-15.1	219.87	216.72	165.4	191.4	- 3.15	26.0	- .12	14.06
4395	p.a	4407	p.a	-20.4	124.04	120.63	199.9	228.4	- 3.41	28.5	- .12	14.06
4416	l.a	4435	l.a	-11.2	297.02	301.78	243.4	267.9	+ 4.76	24.5	+ .19	14.37
4435	l.a	4446	p.a	-11.1	301.78	304.05	267.9	292.9	+ 2.27	25.0	+ .09	14.27
4456	p.a	4473	p.a	-16.0	76.38	77.74	312.9	336.4	+ 1.36	23.5	+ .06	14.24
Year 1897.												
4505	l.a	4526	g	+ 6.4	204.06	212.09	22.4	45.9	+ 8.03	23.5	+ .34	14.52
4517	l.a	4532	p.a	- 1.1	27.01	35.26	34.9	58.9	+ 8.25	24.0	+ .34	14.52
4518	l.a	4535	p.a	- 6.2	347.98	347.81	34.9	62.9	- 0.17	28.0	- .01	14.17
4523	l.a	4531	l.a	+13.2	40.90	45.84	34.9	58.4	+ 4.94	23.5	+ .21	14.39

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1897—contd.												
4526	g	4541	f.c	+ 6.1	212.09	216.05	45.9	72.4	+ 3.96	26.5	+ .15	14.33
4532	p.a	4549	p.a	— 1.3	35.26	41.24	58.9	85.4	+ 5.98	26.5	+ .22	14.40
4560	l.c	4573	p.a	+ 2.9	225.92	232.96	100.4	125.9	+ 7.04	25.5	+ .27	14.45
4579	p.a	4588	p.a	— 8.9	270.13	271.36	150.4	177.4	+ 1.23	27.0	+ .04	14.22
4588	p.a	4599	g	— 9.0	271.36	271.77	177.4	200.4	+ 0.41	23.0	+ .02	14.20
4605	l.a	4615	p.a	— 5.4	69.56	70.91	219.9	246.9	+ 1.35	27.0	+ .05	14.23
4615	p.a	4634	p.a	— 5.9	70.91	73.03	246.9	273.9	+ 2.12	27.0	+ .08	14.26
4663	p.a	4674	p.a	+ 9.8	210.83	209.10	345.9	372.9	— 1.73	27.0	— .06	14.12
Year 1898.												
4687	g	4704	p.a	— 7.5	100.77	104.12	43.9	70.9	+ 3.35	27.0	+ .12	14.30
4765	p.a	4778	g	+ 11.1	333.88	341.41	216.9	243.4	+ 7.53	26.5	+ .28	14.46
4781	l.a	4791	p.a	— 12.4	240.94	240.75	250.9	278.4	— 0.19	27.5	— .01	14.17
Year 1899.												
4848	p.a	4855	p.a	— 12.8	61.40	61.18	90.9	117.9	— 0.22	27.0	— .01	14.17
4855	p.a	4857	p.a	— 12.6	61.18	61.14	117.9	144.9	— 0.04	27.0	.00	14.18
Year 1900.												
4915	l.a	4917	p.a	— 11.3	290.84	292.14	66.3	90.4	+ 1.30	24.1	+ .05	14.23
Year 1901.												
4953	l.a	4955	p.a	+ 9.3	165.72	168.66	145.4	171.3	+ 2.94	25.9	+ .11	14.29
Year 1902. No suitable spots.												
Year 1903.												
5088	l.a	5095	g	+ 13.9	92.72	92.15	269.0	291.8	— 0.57	22.8	— .03	14.15
5091	l.a	5099	p.a	+ 13.9	244.70	248.54	280.9	305.4	+ 3.84	24.5	+ .16	14.34
5100	l.a	5116	l.a	+ 16.9	236.52	233.58	308.9	335.7	— 2.94	26.8	— .11	14.07
5100	f.b	5116	f.b	+ 16.6	227.12	227.53	309.3	336.2	+ 0.41	26.9	+ .02	14.20
5104	l.a	5120	g	— 26.8	165.68	154.79	317.3	339.3	— 10.89	22.0	— .49	13.69
5129	p.a	5146	p.a	+ 18.9	86.96	83.94	346.8	374.9	— 3.02	28.1	— .11	14.07
Year 1904.												
5183	p.a	5204	g	+ 8.1	237.11	244.82	79.9	105.5	+ 7.71	25.6	+ .30	14.48
5195	g	5210	l.a	+ 13.6	105.42	111.27	89.9	117.9	+ 5.85	28.0	+ .21	14.39
5269	l.a	5291	g	— 18.6	60.31	58.56	203.5	227.5	— 1.75	24.0	— .07	14.11
5317	l.a	5329	p.a	— 23.1	326.88	320.27	267.7	290.4	— 6.61	22.7	— .29	13.89

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1904—contd.												
5322	l.a	5351	p.a	-16.2	56.63	59.87	286.7	311.3	+ 3.24	24.6	+ .13	14.31
5366	p.a	5396	p.a	+28.8	246.30	239.92	329.2	349.4	- 6.38	20.2	- .31	13.87
5390	p.a	5420	p.a	+17.6	268.46	263.30	350.3	376.9	- 5.16	26.6	- .19	13.99
Year 1905.												
5441	p.a	5471	p.a	-16.2	329.49	330.75	33.9	61.3	+ 1.26	27.4	+ .05	14.23
5524	l.a	5542	p.b	+11.1	162.11	167.28	131.4	155.8	+ 5.17	24.4	+ .21	14.39
5529	l.a	5550	p.a	-15.2	67.23	69.86	136.8	162.8	+ 2.63	26.0	+ .10	14.28
5529	f.c	5553	p.a	-14.9	53.80	52.42	136.8	164.4	- 1.38	27.6	- .05	14.13
5589	l.a	5620	p.a	+12.6	343.62	346.62	197.1	223.9	+ 3.00	26.8	+ .11	14.29
5597	l.a	5622	l.a	+14.6	323.72	323.89	202.0	225.9	+ 0.17	23.9	+ .01	14.19
5622	l.a	5653	p.a	+13.5	323.89	325.77	225.9	250.9	+ 1.88	25.0	+ .07	14.25
5628	l.a	5655	p.a	+ 3.2	273.68	286.28	231.9	254.9	+12.60	23.0	+ .55	14.73
5680	l.a	5703	p.a	+13.2	236.25	238.70	286.4	313.8	+ 2.45	27.4	+ .09	14.27
5713	p.a	5745	l.a	-17.6	157.37	158.36	319.8	343.3	+ 0.99	23.5	+ .04	14.22
5747	l.a	5775	l.a	+ 8.0	99.09	104.78	351.4	378.9	+ 5.69	27.5	+ .20	14.38
5766	l.a	5788	g	- 8.1	281.78	286.93	364.8	391.8	+ 5.15	27.0	+ .19	14.37
Year 1906.												
5775	l.a	5798	p.a	+ 8.5	104.78	107.02	13.9	40.4	+ 2.24	26.5	+ .08	14.26
5785	l.a	5802	p.a	-10.9	335.38	339.01	24.3	50.3	+ 3.63	26.0	+ .14	14.32
5790	l.a	5803	l.a	+14.1	303.51	309.04	27.9	52.9	+ 5.53	25.0	+ .22	14.40
5817	l.a	5843	p.a	+19.3	106.95	106.21	70.7	95.4	- 0.74	24.7	- .03	14.15
5871	l.a	5889	p.a	+11.9	133.93	135.40	147.4	175.0	+ 1.47	27.6	+ .05	14.23
5886	l.a	5898	p.a	+20.9	7.22	6.62	160.5	184.5	- 0.60	24.0	- .03	14.15
5894	p.a	5928	p.a	+10.4	45.09	48.20	182.5	206.6	+ 3.11	24.1	+ .13	14.31
5898	p.a	5931	p.a	+21.5	6.62	1.25	184.5	211.9	- 5.37	27.4	- .19	13.99
5912	p.a	5935	p.a	+18.2	201.55	199.93	197.0	224.0	- 1.62	27.0	- .06	14.12
5931	p.a	5946	p.a	+22.4	1.25	353.78	211.9	240.4	- 7.47	28.5	- .26	13.92
5933	l.a	5944	p.a	-16.2	24.87	23.90	213.2	238.0	- 0.97	24.8	- .04	14.14
6004	l.a	6034	p.a	-11.4	60.75	63.19	316.8	341.9	+ 2.44	25.1	+ .10	14.28
Year 1907.												
6059	l.a	6098	p.a	+ 7.7	109.47	113.15	2.8	29.8	+ 3.68	27.0	+ .13	14.31
6075	p.a	6103	l.a	-13.2	329.72	337.20	13.3	40.4	+ 7.48	27.1	+ .28	14.46
6088	l.a	6112	g	-16.2	232.38	233.94	21.3	43.4	+ 1.56	22.1	+ .07	14.25
6090	p.a	6115	p.a	+ 5.0	174.10	176.73	24.8	49.3	+ 2.63	24.5	+ .11	14.29
6099	l.a	6123	p.a	+22.6	83.59	77.25	32.3	59.3	- 6.34	27.0	- .23	13.95
6103	l.a	6136	l.a	-13.5	337.20	339.29	40.4	66.4	+ 2.09	26.0	+ .08	14.26
6134	p.a	6156	g	+12.4	356.75	355.69	65.9	92.4	- 1.06	26.5	- .04	14.14
6140	p.a	6161	g	-17.1	309.25	303.50	69.4	96.9	- 5.75	27.5	- .21	13.97
6172	l.a	6189	g	+ 7.4	77.53	82.27	114.4	139.5	+ 4.74	25.1	+ .19	14.37
6205	l.a	6215	p.a	-17.8	68.20	63.71	170.0	196.9	- 4.49	26.9	- .17	14.01
6215	p.a	6233	p.a	-19.0	63.71	56.48	196.9	224.9	- 7.23	28.0	- .26	13.92
6236	l.a	6255	p.a	-23.3	337.43	325.10	230.9	259.0	-12.33	28.1	- .44	13.74
6243	l.a	6267	p.a	-16.8	134.33	134.83	248.0	272.9	+ 0.50	24.9	+ .02	14.20
6247	p.a	6273	p.a	- 7.1	37.25	36.46	253.5	278.3	- 0.79	24.8	- .03	14.15
6256	p.a	6280	p.a	+ 7.4	308.72	310.71	260.0	287.4	+ 1.99	27.4	+ .07	14.25

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1907— <i>contd.</i>												
6276	p.a	6293	p.a	-21.1	351.15	352.48	285.9	310.3	+ 1.33	24.4	+ .05	14.22
6296	l.a	6316	l.a	-13.9	338.87	341.35	312.8	339.9	+ 2.48	27.1	+ .09	14.27
6300	l.a	6318	p.a	+12.1	270.15	277.20	318.8	344.4	+ 7.05	25.6	+ .27	14.45
6318	p.a	6335	g	+13.1	277.20	276.43	344.4	370.4	- 0.77	26.0	- .03	14.15
6323	l.a	6344	g	-15.9	220.11	226.35	350.8	376.4	+ 6.24	25.6	+ .24	14.42
6324	l.a	6349	l.a	- 4.5	143.43	147.64	354.8	381.4	+ 4.21	26.6	+ .16	14.34
Year 1908.												
6390	g	6416	g	- 9.0	180.81	184.39	96.4	123.4	+ 3.58	27.0	+ .13	14.31
6393	g	6420	p.a	-15.1	161.85	162.32	98.9	124.8	+ 0.47	25.9	+ .02	14.20
6420	p.a	6440	g	-15.0	162.32	158.46	124.8	152.4	- 3.86	27.6	- .14	14.04
6436	l.a	6453	g	+10.9	331.52	333.34	139.4	165.9	+ 1.82	26.5	+ .07	14.25
6441	p.a	6464	p.a	- 3.0	144.56	154.06	152.9	179.9	+ 9.50	27.0	+ .35	14.53
6465	p.a	6489	g	-16.4	130.64	127.16	181.8	208.9	- 3.48	27.1	- .13	14.05
6494	l.a	6517	p.a	- 6.4	354.04	354.91	221.3	245.9	+ 0.87	24.6	+ .03	14.21
6499	l.a	6519	p.a	- 5.5	274.38	279.67	228.8	251.9	+ 5.29	23.1	+ .23	14.41
6517	p.a	6535	p.a	- 6.5	354.91	357.15	245.9	271.9	+ 2.24	26.0	+ .08	14.26
6519	p.a	6539	p.a	- 5.4	279.67	278.77	251.9	278.9	- 0.90	27.0	- .03	14.15
6520	g	6540	p.a	+12.2	268.24	271.61	253.4	280.0	+ 3.37	26.6	+ .13	14.31
6540	p.a	6558	g	+12.4	271.61	271.71	280.0	306.4	+ 0.10	26.4	.00	14.18
6577	p.a	6592	p.a	+11.6	168.05	166.50	342.8	369.7	- 1.55	26.9	- .06	14.12
6589	l.a	6602	g	- 3.0	322.42	326.70	361.2	384.9	+ 4.28	23.7	+ .18	14.36
Year 1909.												
6592	p.a	6609	p.a	+10.0	166.50	167.18	3.7	30.9	+ 0.68	27.2	+ .02	14.20
6602	g	6618	g	- 3.0	326.70	331.98	18.9	44.9	+ 5.28	26.0	+ .20	14.38
6604	p.a	6621	p.a	+ 8.2	296.89	298.53	21.3	47.9	+ 1.64	26.6	+ .06	14.24
6610	p.a	6628	p.a	-16.8	152.64	150.83	31.7	58.7	- 1.81	27.0	- .07	14.11
6676	l.a	6686	p.a	- 1.6	341.98	347.21	157.8	180.8	+ 5.23	23.0	+ .23	14.41
6695	l.a	6711	p.a	+ 6.6	40.85	42.53	204.5	230.8	+ 1.68	26.3	+ .06	14.24
6722	l.a	6733	p.a	-12.6	158.62	168.60	251.3	276.8	+ 9.98	25.5	+ .39	14.57
6723	l.a	6734	p.a	- 1.1	163.10	167.08	252.6	276.8	+ 3.98	24.2	+ .16	14.34
6733	p.a	6754	a	-13.3	168.60	167.82	276.8	302.9	- 0.78	26.2	- .03	14.15
6734	p.a	6753	g	+ 0.4	167.08	169.73	276.8	303.9	+ 2.65	27.1	+ .10	14.28
6746	p.a	6765	g.a	- 4.9	311.83	310.67	293.3	320.3	- 1.16	27.0	- .04	14.14
6756	l.a	6778	g.a	- 4.9	94.51	97.79	309.8	333.9	+ 3.28	24.1	+ .13	14.31
6771	l.a	6786	g.a	-13.4	182.65	184.13	329.8	356.8	+ 1.48	27.0	+ .05	14.23
6772	p.a	6787	g.a	-12.7	167.24	172.30	330.9	357.9	+ 5.06	27.0	+ .19	14.37
6774	l.a	6788	p.a	+14.7	171.99	170.32	332.3	357.9	- 1.67	25.6	- .06	14.12
6793	p.a	6809	p.a	-15.7	84.22	82.08	364.3	391.8	- 2.14	27.5	- .08	14.10
Year 1910.												
6796	l.a	6811	g	+ 5.4	58.98	65.95	1.7	28.3	+ 6.97	26.6	+ .26	14.44
6813	l.a	6826	b	-15.3	187.97	187.22	46.9	72.8	- 0.75	25.9	- .03	14.15
6813	f.b	6826	c	-11.7	184.11	188.19	46.9	73.9	+ 4.08	27.0	+ .15	14.33
6817	l.a	6827	p.a	- 7.3	107.21	115.23	55.4	77.9	+ 8.02	22.5	+ .36	14.54
6823	l.a	6828	g.a	+15.9	3.39	3.41	62.4	87.4	+ 0.02	25.0	.00	14.18
6849	l.a	6859	p.a	-10.5	51.35	54.75	138.4	162.0	+ 3.40	23.6	+ .14	14.32
6874	p.a	6880	p.a	-15.6	48.39	47.18	220.5	248.0	- 1.21	27.5	- .04	14.14

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		α .	γ .	α/γ .	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1911.												
6937	l.a	6942	g	- 1.8	195.23	202.86	90.9	116.9	+ 7.63	26.0	+ .29	14.47
6944	g.a	6950	g.a	- 6.2	189.45	193.38	117.9	140.8	+ 3.93	22.9	+ .17	14.35
Years 1912 and 1913. No suitable Spots.												
Year 1914.												
7060	p.a	7068	g.a	+18.4	68.01	65.21	230.9	258.5	- 2.80	27.6	- .10	14.08
7102	l.a	7122	g	-22.8	115.90	109.44	336.4	363.9	- 6.46	27.5	- .24	13.94
Year 1915.												
7169	p.a	7204	p.a	+23.4	239.27	234.49	42.4	69.4	- 4.78	27.0	- .18	14.00
7223	p.a	7255	l.a	+19.9	299.89	295.52	93.9	121.4	- 4.37	27.5	- .16	14.02
7255	l.a	7285	g.a	+20.2	295.52	289.00	121.4	149.4	- 6.52	28.0	- .23	13.95
7266	l.a	7282	p.a	+21.7	317.02	312.35	123.4	147.4	- 4.67	24.0	- .19	13.99
7304	l.a	7341	p.a	+17.6	6.02	10.32	174.4	197.4	+ 4.30	23.0	+ .19	14.37
7315	l.a	7343	g.a	+19.5	347.58	350.06	174.9	198.9	+ 2.48	24.0	+ .10	14.28
7341	p.a	7384	g.a	+18.0	10.32	9.08	197.4	224.9	- 1.24	27.5	- .05	14.13
7406	l.a	7445	g.a	+22.2	189.53	184.93	239.4	263.9	- 4.60	24.5	- .19	13.99
7418	g.a	7450	g.a	-16.3	77.16	81.54	246.9	273.4	+ 4.38	26.5	+ .17	14.35
7564	p.a	7595	g	+10.3	173.40	175.30	352.4	375.9	+ 1.90	23.5	+ .08	14.26
Year 1916.												
7595	g	7622	g	+10.8	175.30	174.60	10.9	38.4	- 0.70	27.5	- .03	14.15
7618	l.a	7646	g	-13.1	239.01	241.79	34.9	59.9	+ 2.78	25.0	+ .11	14.29
7683	l.a	7701	l.a	+20.1	231.20	233.81	93.4	111.9	+ 2.61	18.5	+ .14	14.32
7683	f.b	7701	f.b	+20.6	227.40	224.36	93.4	113.4	- 3.04	20.0	- .15	14.03
7708	g	7733	g	+10.4	107.29	108.73	125.4	152.4	+ 1.44	27.0	+ .05	14.23
7733	g	7756*	g	+10.2	108.73	111.40	152.4	175.4	+ 2.67	23.0	+ .12	14.30
7737	l.a	7751	l.a	+12.8	128.40	128.64	155.3	178.4	+ 0.24	23.1	+ .01	14.19
7737	f.b	7751	f.b	+14.0	122.77	124.92	155.3	177.9	+ 2.15	22.6	+ .10	14.28
7740	l.a	7767	l.a	+ 6.8	297.91	302.18	164.9	189.9	+ 4.27	25.0	+ .17	14.35
7746	l.a	7769	g	+13.4	273.90	277.33	170.4	193.9	+ 3.43	23.5	+ .15	14.33
7748	l.a	7771	g	+17.1	180.92	180.05	176.4	201.4	- 0.87	25.0	- .03	14.15
7769	g	7789	g	+12.9	277.33	275.26	193.9	221.4	- 2.07	27.5	- .07	14.11
7772	l.a	7796	g	+ 8.8	164.01	168.69	204.4	229.4	+ 4.68	25.0	+ .19	14.37
7820	l.a	7852	g	+24.5	134.38	131.27	259.4	286.9	- 3.11	27.5	- .11	14.07
7831	f.b	7845	g	+18.4	148.60	145.38	262.4	285.9	- 3.22	23.5	- .14	14.04
7833	l.a	7853	g	+26.2	112.44	113.22	264.4	288.4	+ 0.78	24.0	+ .03	14.21
7845	g	7870	f.b	+17.5	145.38	147.25	285.9	313.4	+ 1.87	27.5	+ .07	14.25
7853	g	7876	l.a	+24.8	112.26	107.87	288.4	315.9	+ 4.39	27.5	- .16	14.02
7865	f.b	7891	l.a	-21.2	260.28	259.69	307.9	330.4	- 0.59	22.5	- .03	14.15
7895	l.a	7918	g	-21.8	215.97	215.17	339.4	362.4	- 0.80	23.0	- .03	14.15
7899	l.a	7920	g	+ 7.8	181.37	187.55	341.4	364.4	+ 6.18	23.0	+ .27	14.45

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.	2nd Rotation.		1st Rotation.		2nd Rotation.	1st Rotation.	2nd Rotation.					
Year 1917.												
7949	1.a	7980	g	+19.6	347.40	344.02	16.9	40.4	- 3.38	23.5	- .14	14.04
7977	1.a	8008	1.a	-14.8	15.27	15.76	39.9	66.4	+ 0.49	26.5	+ .02	14.20
7977	f.b	8008	f.b	-17.9	4.66	3.68	40.4	66.9	- 0.98	26.5	- .04	14.14
8002	1.a	8038	g	+24.1	67.93	67.16	62.9	87.9	- 0.77	25.0	- .03	14.15
8009	1.a	8037	g	+23.5	95.52	89.70	63.9	84.4	- 5.82	20.5	- .28	13.90
8024	1	8046	g	- 9.8	232.94	236.73	78.9	103.4	+ 3.79	24.5	+ .15	14.33
8047	1.a	8073	g	+18.4	250.34	247.35	105.4	130.4	- 2.99	25.0	- .12	14.06
8049	1.a	8076	g	+ 9.8	219.17	224.88	105.9	132.4	+ 5.71	26.5	+ .22	14.40
8076	g	8104	g	+ 9.8	224.88	228.02	132.4	159.4	+ 3.14	27.0	+ .12	14.30
8089	1.a	8125	g	-24.6	24.78	16.25	147.4	175.4	- 8.53	28.0	- .30	13.88
8104	g	8140	g	+10.8	228.02	230.16	159.4	186.4	+ 2.14	27.0	+ .08	14.26
8125	g	8163	g	-23.6	16.25	10.09	175.4	203.4	- 6.16	28.0	- .22	13.96
8189	1.a	8221	g	+ 0.3	204.75	212.30	218.9	242.4	+ 7.55	23.5	+ .32	14.50
8199	1.a	8239	g	-16.8	72.13	68.97	225.4	251.9	- 3.16	26.5	- .12	14.06
8215	1.a	8260	g	-17.0	264.96	262.35	238.4	265.4	- 2.61	27.0	- .10	14.08
8256	1.a	8289	g	-12.8	284.28	286.83	264.4	290.9	+ 2.55	26.5	+ .10	14.28
8257	1.a	8290	g	+13.6	270.32	271.99	264.9	292.4	+ 1.67	27.5	+ .06	14.24
8289	g	8315	g	-10.9	286.83	287.83	290.9	318.4	+ 1.00	27.5	+ .04	14.22
8307	1.a	8334	g	+ 6.4	59.48	65.78	311.4	334.4	+ 6.30	23.0	+ .27	14.45
8317	1.a	8348	g	+ 7.7	303.02	306.43	319.9	344.4	+ 3.41	24.5	+ .14	14.32
8328	1.a	8370	g	-13.6	111.14	115.44	332.9	358.4	+ 4.30	25.5	+ .17	14.35
8337	1.a	8366	g	- 6.3	123.23	129.80	333.9	357.4	+ 6.57	23.5	+ .28	14.46
8353	1.a	8389	g	+ 6.3	262.33	267.64	348.4	373.4	+ 5.31	25.0	+ .21	14.39
8354	1.a	8387	f.b	+ 6.7	298.68	306.35	347.9	371.4	+ 7.67	23.5	+ .33	14.51
8366	g	8401	p.a	- 6.5	129.80	133.97	357.4	384.4	+ 4.17	27.0	+ .15	14.33
8369	1.a	8402	1.a	+16.3	129.29	127.69	359.4	385.4	- 1.60	26.0	- .06	14.12
8369	f.b	8402	f.b	+18.5	120.98	117.13	360.4	382.9	- 3.85	22.5	- .17	14.01
8377	1.a	8409	g	- 8.1	55.98	59.84	363.4	390.4	+ 3.86	27.0	+ .14	14.32
Year 1918.												
8387	f.b	8419	g	+ 7.4	306.35	308.08	6.4	33.9	+ 1.73	27.5	+ .06	14.24
8419	g	8444	g	+ 7.3	308.08	307.23	33.9	60.9	- 0.85	27.0	- .03	14.15
8433	1.a	8456	g	+ 2.9	130.48	136.68	47.4	71.4	+ 6.20	24.0	+ .26	14.44
8462	1.a	8483	g	+ 6.9	181.72	185.93	72.9	97.9	+ 4.21	25.0	+ .17	14.35
8473	g	8500	g	- 5.0	321.48	326.11	87.4	114.4	+ 4.63	27.0	+ .17	14.35
8478	1.a	8501	p.a	-22.1	292.00	287.49	93.4	115.4	- 4.51	22.0	- .20	13.98
8479	1.a	8508	g	+14.6	223.75	226.60	94.9	118.4	+ 2.85	23.5	+ .12	14.30
8484	1.a	8507	g	+27.3	250.78	242.18	96.9	119.9	- 8.60	23.0	- .37	13.81
8516	1.a	8549	g	+17.3	139.42	136.61	128.4	155.9	- 2.81	27.5	- .10	14.08
8549	g	8573	g	+16.9	136.61	131.69	155.9	183.4	- 4.92	27.5	- .18	14.00
8582	1.a	8615	g	+10.8	83.86	86.01	187.4	213.9	+ 2.15	26.5	+ .08	14.26
8597	1.a	8623	g	- 9.7	354.03	360.13	198.4	217.9	+ 6.10	19.5	+ .31	14.49
8612	1.a	8651	g	+16.6	132.30	132.86	211.9	237.9	+ 0.56	26.0	+ .02	14.20
8615	g	8657	g	+10.5	86.01	86.50	213.9	238.9	+ 0.49	25.0	+ .02	14.20
8619	1.a	8660	g	-20.4	30.06	25.95	217.9	242.9	- 4.11	25.0	- .16	14.02
8631	1.a	8669	g	+10.5	272.37	271.71	227.4	252.9	- 0.66	25.5	- .03	14.15
8631	f.b	8670	g	+ 9.1	260.00	263.03	224.4	250.9	+ 3.03	26.5	+ .11	14.29
8651	g	8680	g	+15.8	132.86	130.43	237.9	264.9	- 2.43	27.0	- .09	14.09
8683	1.a	8715	g	+ 7.4	124.52	127.65	266.9	291.9	+ 3.13	25.0	+ .12	14.30
8691	1.a	8717	g	+10.8	104.93	109.89	271.4	293.9	+ 4.96	22.5	+ .22	14.40
8703	1.a	8727	g	+ 0.7	298.58	304.63	282.9	306.4	+ 6.05	23.5	+ .26	14.44

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		π .	y .	π/y .	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
Year 1918— <i>contd.</i>												
8738	1.a	8766	g	-10.5	143.56	148.66	322.4	345.9	+ 5.10	23.5	+ .22	14.40.
8766	g	8791	g	- 9.8	148.66	150.62	345.9	371.9	+ 1.96	26.0	+ .08	14.26.
8773	1.a	8798	g	- 8.2	36.92	42.97	355.4	380.9	+ 6.05	25.5	+ .24	14.42
8774	g	8801	g	-21.2	6.83	1.60	356.4	379.9	- 5.23	23.5	- .22	13.96
Year 1919.												
8815	1.a	8834	g	- 5.8	290.84	301.22	27.4	50.9	+10.38	23.5	+ .44	14.62
8834	g	8858	g	- 5.9	301.22	303.95	50.9	77.9	+ 2.73	27.0	+ .10	14.28
8839	g	8861	g	+13.2	204.35	204.01	58.4	83.4	- 0.34	25.0	- .01	14.17
8850	1.a	8871	g	+ 6.5	79.22	84.85	68.9	94.9	+ 5.63	26.0	+ .22	14.40
8862	1.a	8884	g	-19.4	182.51	181.43	87.4	114.9	- 1.08	27.5	- .04	14.14
8871	g	8889	g	+ 6.3	84.85	87.37	94.9	121.9	+ 2.52	27.0	+ .09	14.27
8884	g	8903	g	-19.6	181.43	174.90	114.9	140.4	- 6.53	25.5	- .26	13.92
8889	g	8909	g	+ 8.3	87.37	89.21	121.9	148.9	+ 1.84	27.0	+ .07	14.25
8895	1.a	8917	g	+ 6.9	6.56	10.54	127.9	154.9	+ 3.98	27.0	+ .15	14.33
8902	1.a	8932	g	- 7.9	209.91	220.10	140.9	165.4	+10.19	24.5	+ .41	14.59
8917	g	8958	g	+ 8.0	10.54	13.42	154.9	179.9	+ 2.88	25.0	+ .11	14.29
8922	1.a	8952	g	+ 4.6	54.77	61.76	156.4	177.9	+ 6.99	21.5	+ .33	14.51
8948	1.a	8973	g	-13.3	113.80	114.41	177.9	200.9	+ 0.61	23.0	+ .03	14.21
8955	1.a	8971	g	+ 7.4	122.06	126.59	177.4	200.4	+ 4.53	23.0	+ .20	14.38
8966	1.a	8994	g	- 6.3	219.40	226.87	194.9	219.9	+ 7.47	25.0	+ .30	14.48
8966	f.b	8996	g	- 9.6	210.24	212.67	195.9	220.9	+ 2.43	25.0	+ .10	14.28
8973	g	9002	g	-14.1	114.41	114.13	200.9	228.9	- 0.28	28.0	- .01	14.17
8994	g	9021	g	- 6.7	226.87	230.51	219.9	245.9	+ 3.64	26.0	+ .14	14.32
9005	1.a	9031	g	+ 2.7	96.14	103.02	230.4	256.9	+ 6.88	26.5	+ .26	14.44
9007	1.a	9030	g	- 2.1	98.05	105.41	230.4	256.4	+ 7.36	26.0	+ .28	14.46
9031	g	9047	g	+ 1.9	103.02	106.32	256.9	283.9	+ 3.30	27.0	+ .12	14.30
9040	g	9056	g	-11.6	273.41	275.80	271.4	297.9	+ 2.39	26.5	+ .09	14.27
9043	1.a	9059	g	-15.0	223.15	222.71	275.4	302.4	- 0.44	27.0	- .02	14.16
9047	g	9065	g	+ 3.0	106.32	106.89	283.9	311.4	+ 0.57	27.5	+ .02	14.20
9064	1.a	9075	g	-15.0	145.37	142.97	308.9	335.4	- 2.40	26.5	- .09	14.09
9065	g	9077	g	+ 3.4	106.89	108.91	311.4	336.4	+ 2.02	25.0	+ .08	14.26
Year 1920.												
9108	1.a	9127	g	- 5.9	125.96	132.00	26.4	51.4	+ 6.04	25.0	+ .24	14.42
9143	1.a	9157	g	- 6.1	144.19	147.99	81.9	106.9	+ 3.80	25.0	+ .15	14.33
9144	g	9158	g	- 5.2	117.50	121.54	81.9	106.4	+ 4.04	24.5	+ .16	14.34
9157	g	9174	g	- 5.9	147.99	151.16	106.9	131.9	+ 3.17	25.0	+ .13	14.31
9189	l	9204	g	+13.9	218.81	222.90	156.4	182.9	+ 4.09	26.5	+ .15	14.33
9204	g	9215	g	+13.5	222.90	224.55	182.9	209.4	+ 1.65	26.5	+ .06	14.24
9207	1.a	9216	g	-14.5	196.75	196.38	184.9	211.9	- 0.37	27.0	- .01	14.17
9213	g	9225	g	+11.6	299.30	303.39	204.4	229.4	+ 4.09	25.0	+ .16	14.34
9251	l	9263	g	+17.7	153.66	149.13	299.4	324.9	- 4.53	25.5	- .18	14.00
9258	1.a	9270	g	- 9.2	351.41	357.04	309.9	336.4	+ 5.63	26.5	+ .21	14.39
Year 1921.												
9284	1.a	9294	g	-15.1	211.54	213.38	12.4	35.9	+ 1.84	23.5	+ .08	14.26
9315	1.a	9329	g	+ 9.4	282.31	285.22	85.4	112.4	+ 2.91	27.0	+ .11	14.29
9334	1.a	9345	g	+ 0.9	7.06	15.35	134.9	159.9	+ 8.29	25.0	+ .33	14.51

DETERMINATION OF SOLAR ROTATION FROM LONG-LIVED SPOTS FROM 1878-1923.

Group Number and Spot.				Mean Latitude.	Mean Longitude.		Mean Date.		x.	y.	x/y.	Diurnal Motion.
1st Rotation.		2nd Rotation.			1st Rotation.	2nd Rotation.	1st Rotation.	2nd Rotation.				
				°	°	°			°		°	°
Year 1921— <i>contd.</i>												
9345	g	9360	f.b	+ 0.8	15.35	20.01	159.9	186.9	+ 4.66	27.0	+ .17	14.35
9384	l.a	9393	g	+ 11.5	113.27	116.90	239.4	284.9	+ 3.63	45.5	+ .08	14.26
9396	l.a	9399	g	+ 7.7	41.07	43.48	298.4	321.4	+ 2.41	23.0	+ .10	14.28
9397	l.a	9400	g	+ 3.9	330.43	332.49	300.4	326.4	+ 2.06	26.0	+ .08	14.26
9401	l.a	9407	g	— 5.6	319.00	324.81	327.9	354.9	+ 5.81	27.0	+ .22	14.40
9407	g	9415	g	— 5.7	324.81	329.46	354.9	381.4	+ 4.65	26.5	+ .18	14.36
9415	g	9421	g	— 5.2	329.46	335.35	381.4	408.4	+ 5.89	27.0	+ .22	14.40
Year 1922.												
9426	l.a'	9439	g	+ 7.8	117.10	122.56	63.4	86.9	+ 5.46	23.5	+ .23	14.41
9426	f.b	9441	g	+ 8.7	105.90	103.29	61.9	86.9	— 2.61	25.0	— .10	14.08
9451	l.a	9452	g	+ 8.0	18.75	22.57	123.9	147.4	+ 3.82	23.5	+ .16	14.34
9465	l.a	9472	g	— 11.8	343.08	344.20	237.9	283.9	+ 1.12	46.0	+ .02	14.20
9477	g	9483	g	— 5.6	0.62	3.89	314.4	338.4	+ 3.27	24.0	+ .13	14.31
9482	l.a	9486	g	— 3.7	50.93	55.50	337.4	363.9	+ 4.57	26.5	+ .17	14.35
Year 1923.												
9511	g	9514	g	— 16.9	58.80	57.59	272.4	298.9	— 1.21	26.5	— .05	14.13

The mean diurnal motions are collected in the following table for each of the four cycles with their respective latitudes in 5° zones from the equator to $\pm 30^\circ$. Cycle I includes the years 1878-1888; Cycle II, 1889-1899; Cycle III, 1900-1913; Cycle IV, 1914-1923. The mean latitude is indicated by (ϕ), the sidereal diurnal motion by (ξ), and the number of spots by (n).

Cycle I.	II.	III.	IV.	Mean.	Observed Minus Computed.
$0^\circ-5^\circ \left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 2^\circ.5 \\ 14^\circ.34 \\ 7 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 2^\circ.2 \\ 14^\circ.46 \\ 7 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 3^\circ.0 \\ 14^\circ.38 \\ 12 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 2^\circ.6 \\ 14^\circ.38 \\ 14 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 2^\circ.6 \\ 14^\circ.38 \\ 40 \end{array}$	$+^\circ.01$
$5^\circ-10^\circ \left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 8^\circ.3 \\ 14^\circ.28 \\ 22 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 7^\circ.5 \\ 14^\circ.30 \\ 22 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 7^\circ.4 \\ 14^\circ.31 \\ 20 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 7^\circ.4 \\ 14^\circ.36 \\ 47 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 7^\circ.6 \\ 14^\circ.33 \\ 111 \end{array}$	$^\circ.00$
$10^\circ-15^\circ \left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 12^\circ.8 \\ 14^\circ.23 \\ 23 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 12^\circ.3 \\ 14^\circ.23 \\ 47 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 12^\circ.8 \\ 14^\circ.27 \\ 34 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 12^\circ.4 \\ 14^\circ.25 \\ 32 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 12^\circ.5 \\ 14^\circ.25 \\ 136 \end{array}$	$^\circ.00$
$15^\circ-20^\circ \left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 17^\circ.0 \\ 14^\circ.16 \\ 18 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 17^\circ.9 \\ 14^\circ.12 \\ 27 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 16^\circ.9 \\ 14^\circ.15 \\ 24 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 17^\circ.6 \\ 14^\circ.12 \\ 26 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 17^\circ.4 \\ 14^\circ.13 \\ 95 \end{array}$	$-^\circ.01$
$20^\circ-25^\circ \left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 22^\circ.2 \\ 14^\circ.00 \\ 15 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 21^\circ.8 \\ 14^\circ.02 \\ 14 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 22^\circ.1 \\ 13^\circ.99 \\ 7 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 22^\circ.4 \\ 14^\circ.03 \\ 18 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 22^\circ.2 \\ 14^\circ.01 \\ 54 \end{array}$	$+^\circ.01$
$25^\circ-30^\circ \left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 25^\circ.9 \\ 13^\circ.87 \\ 4 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 28^\circ.4 \\ 13^\circ.78 \\ 5 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 27^\circ.8 \\ 13^\circ.78 \\ 2 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 26^\circ.8 \\ 14^\circ.01 \\ 2 \end{array}$	$\left\{ \begin{array}{l} \phi \\ \xi \\ n \end{array} \right. \begin{array}{l} 27^\circ.3 \\ 13^\circ.85 \\ 13 \end{array}$	$+^\circ.02$

The value of the sidereal angular daily motion found from the collected data is expressed by

$$\xi = 14^\circ.37 - 2^\circ.60 \sin 2\phi.$$

The discordances from this formula are given in the last column of the preceding table. The mean deviation of a single spot is $\pm 0^\circ.08$, and is the same in all latitudes. The observations have been classified according to the hemisphere in which the spots occur.

For the Northern hemisphere

$$\xi = 14^\circ.36 - 2^\circ.34 \sin 2\phi \text{ from 223 spots.}$$

For the Southern hemisphere

$$\xi = 14^{\circ} \cdot 38 - 2 \cdot 82 \sin^2 \phi \text{ from 226 spots.}$$

These results point to no measurable difference between the two hemispheres from the equator to $\pm 30^{\circ}$. Their degree of accordance may be used as a means of determining the probable error of the formula obtained for the daily sidereal motion—

$$14^{\circ} \cdot 37 \pm ^{\circ} \cdot 01 - (2^{\circ} \cdot 60 \pm ^{\circ} \cdot 24) \sin^2 \phi.$$

A summary of these results, with a comparison with other determinations of the Solar Rotation, is given in *Monthly Notices* of the R.A.S. for April, 1925, pp. 548-552.

CHARACTERISTIC MOVEMENTS OF SUN SPOTS.

It has been shown above that the average daily motion of Sun Spots in latitude ϕ is given by the formula $\xi = 14^{\circ} \cdot 37 - 2^{\circ} \cdot 60 \sin^2 \phi$. It is known that the motion of spots in longitude is not uniform, and particularly that the "leader" spot immediately after formation tends to move forward in longitude. In order to obtain more definitive information on this characteristic movement, the longitudes of suitable spots used in the previous discussion have been tabulated for each day onwards from the day of their formation.

The longitudes for each day were taken from the annual volumes, where they are given corresponding to an assumed rotation of the sun $\xi = 14^{\circ} \cdot 18$ constant for all latitudes. These were corrected to correspond with a mean rotation $\xi = 14^{\circ} \cdot 37 - 2^{\circ} \cdot 60 \sin^2 \phi$, appropriate to the latitude. By taking out the means the displacement in longitude of a spot for each day of its existence was obtained.

There are of necessity gaps of about 14 days' duration when the spots were on the invisible hemisphere, and days for which there were less than seven observations have been omitted from the tables.

A division of the material has been made between (a) Recurrent Spots which were seen to disappear at their first return, (b) Spots which passed off the disc after their first return but did not come round again, and (c) Spots which returned a second time. The length of life in these three classes is approximately 30, 45 and 60 days respectively. The displacements of spots for each day from their mean positions are given for these three groups separately in Tables I, II and III.

TABLE I.
(a) 30-Day "Leader" Spots.

Displacement of Spots in longitude (unit=0.1).

Group Numbers.	Lat.	1	2	3	4	5	6	7	8	9	10	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
433, 51	..	+21.3	-9	-1	+15	+10	+20	+20	+31	+37	+22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
552, 74	..	+14.6	+13	+12	+2	+22	+14	+30	+22	..	+22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
566, 82	..	+12.5	-10	-4	+8	+7	+18	+15	+8	+9	+9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
594, 605	..	+21.8	-20	-28	-27	-34	-31	-34	-43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
693, 712	..	+24.4	-32	-26	-20	-7	+4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
785, 806	..	+10.0	-19	-4	+6	+17	+10	+16	+11	..	+20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1438, 55	..	-3.1	-30	-23	-8	-3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1532, 48	..	-7.1	-19	-15	-11	-5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1632, 47	..	-16.3	-17	-6	+1	+5	+21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1756, 67	..	-3.2	..	-2	+5	+2	+2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1906, 15	..	-9.0	-23	-6	+4	+8	+10	+11	+9	+6	-2	-1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2085, 86	..	+5.8	-2	+13	+14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2159, 65	..	+20.4	-38	-22	-8	+7	+10	+8	+5	+8	+7	+3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2247, 66	..	-21.9	-19	-15	+6	+17	+26	+28	+30	+23	+22	+25	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2530, 62	..	+11.1	+27	+32	+31	+27	+20	+19	+17	+12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2730, 59	..	+19.8	-18	-12	+2	+13	+16	+7	+25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2773, 94	..	-11.6	-81	-76	-67	-42	-25	-3	+17	+22	+29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3007, 112	..	+16.9	+37	+17	+35	+32	+42	+41	+27	+26	+18	+9	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3206, 46	..	+9.1	-53	-50	-41	-27	-22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3287, 304	..	+19.0	-60	-36	-30	-16	-20	-5	+2	+9	+15	+17	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3414, 42	..	-4.4	-44	-52	-33	-8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3546, 83	..	-1.0	-32	-14	-4	+7	+8	+19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3640, 74	..	-7.2	-45	-36	-23	-21	-14	-4	+1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3817, 36	..	-14.0	+2	+7	+16	+20	+21	+25	+23	+20	+11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3906, 4025	..	-12.8	-7	..	+2	+12	+12	+5	+4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4028, 61	..	-23.9	-62	-33	-19	-17	-11	-11	-11	-11	-11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4207, 33	..	-8.7	-26	+10	+16	+27	+30	+35	+32	+26	+22	+14	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4210, 30	..	+9.5	-15	-8	+4	+8	+1	-4	-6	-2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4305, 20	..	-15.9	-44	-38	-24	-9	-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5104, 20	..	-26.8	+18	+23	+25	+27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5317, 29	..	-23.1	+2	+9	+12	+28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5366, 96	..	+28.8	-18	-12	-6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5894, 928	..	+10.4	-13	-8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6088, 112	..	-16.2	-43	-35	-28	-16	-6	+2	+9	+7	+13	+16	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6243, 67	..	-16.8	-21	-14	-10	-6	-6	+2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6247, 73	..	-7.1	+7	+15	+24	+28	+25	+21	+16	+16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6276, 93	..	-21.1	-39	-28	-24	-24	-25	-27	-18	-23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6123, 44	..	-15.0	-70	-45	-42	-39	-31	-32	-22	-30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6817, 27	..	-7.3	-38	-32	-29	-31	-25	-21	-17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6823, 28	..	+15.9	-12	-6	+3	+3	+2	+1	+1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7406, 45	..	+22.2	-15	-1	+4	+8	+11	+9	+6	+1	-4	-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7618, 46	..	-13.1	-20	-9	-5	-4	-6	-7	-6	-3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7748, 71	..	+17.1	-16	-7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7949, 80	..	+19.6	+4	+7	+8	+6	+5	+3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8002, 38	..	+24.1	-49	-37	-34	-31	-35	-24	-11	-6	-2	-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8009, 37	..	+23.5	-2	+6	+11	+12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8024, 46	..	-9.8	-15	-5	-2	-3	-4	-6	-7	-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8189, 221	..	+9.3	-33	-25	-16	-13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8109, 34	..	+6.4	-43	-29	-18	-9	+4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8153, 89	..	+6.3	-45	-40	-21	-1	+7	+11	+10	+11	+9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8462, 83	..	+6.9	-17	-3	+4	+2	+2	-2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8478, 501	..	-22.1	-1	+4	+11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8484, 507	..	+27.3	-11	+5	+11	+6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8597, 623	..	-9.7	-24	-25	-28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8683, 715	..	+7.4	-20	-3	+5	+14	+15	+14	+9	+2	-1	-3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8703, 27	..	+0.7	-29	-13	-5	-7	-3	-3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8773, 98	..	-8.2	-53	-21	-14	-15	-15	-2	-7	-2	-2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8902, 32	..	-7.9	-80	-58	-40	-39	-32	-26	-20	-13	-6	-1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8955, 71	..	+7.4	-18	-10	+1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9451, 52	..	+8.0	+2	-2	-3	-3	-2	-6	-7	-1	-1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Days on which Photographs are

TABLE II.

(b) 45-Day "Leader" Spots.

on day of formation (day 1) and successive days.

Group Numbers.	Lat.	1	2	3	4	5	6	7	8	9	10	11	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
348, 59 ..	+22.4	-47	-44	-21	-13	+2	-7																								
408, 19 ..	+16.5	-29	-17	+6	+17	+7																									
410D, 24	-19.0	-63	-41	-28	-20	-3	+13	+2																							
553, 75 ..	+20.6	+14	+18	+22	+24	+17	..	+16	..	+19																					
606, 28 ..	+16.9	..	-51	-19	-15	-7	-5	-5	-5	0	-5	+2																			
642, 58 ..	+16.2	-63	-53	-48																											
664, 87 ..	-13.8	-25	..	-6	+10																										
808, 21 ..	-11.5	+4	+11	+8	+2																										
909, 1027	-22.1	+3	+14	+19	..	+13	+15	+13	+7	+4	0	+6																			
1288, 323 ..	+13.4	-101	..	-79	..	-59	-47	-40	-35	-31	-17	-13																			
1480, 501 ..	+14.2	+7	+19	+24	..	+24	+22																								
1546, 63 ..	+2.4	+2	+10	+16	+12	+12	+11	+10	+19																						
1738, 59 ..	-11.9	..	-17	-14	-11	-11	-9	-5	-7	-5	-9	-5																			
1860, 74 ..	-17.5	-32	-13	-05	+7	+9	+14	+11	+18	+17																					
2097, 100 ..	-19.8	-13	+14	+19	+20	+12	+10	+11	+07																						
2183, 93 ..	+19.6	-72	-63	-44	-39	-33	-32	-31	-23	-22																					
2726, 60 ..	+7.5	+7	+10	+21	+22	+17	+22	+24	+19	+7	+22	+15																			
3015, 54 ..	-20.2	+12	+22	+18	+14																										
3059, 98 ..	+10.9	-33	-23	-13	-3	-4	-4	-2	-2																						
3106, 56 ..	-19.1	+3	+7	+11	+22	+23	+24	+9	+3	+16	-4																				
3460, 92 ..	+10.9	-39	-19	+7	+20	+22	+33	+33	+20	+18	+16	+15																			
4084, 112 ..	-6.4	+14	+10	+17	+15	+14	+17	+17	+14	+16	+11																				
4523, 31 ..	+13.2	-46	-28	..	-14	-17																									
4560, 73 ..	+2.9	-47	-37	-24	-11	0	0	+4	0	-3																					
4915, 17 ..	-11.3	+1	+7	+8	+6	+5																									
5088, 95 ..	+13.9	+9	+11	+17	+8																										
5524, 42 ..	+11.1	-26	-28	-17	-11	-11	-14	-18																							
5628, 55 ..	+3.2	-88	-73	-59	-46	-36	-31																								
5790, 803 ..	+14.1	-67	-39	-34	-30	-22	-11	-7	-10																						
5817, 43 ..	+19.3	-23	-19	-14	-7	-3	+6																								
5933, 44 ..	-16.2	+9	+8	+1	+1	+2	-3																								
6099, 123 ..	+22.6	+1	+1	-2	-1	-7	+7	+14	+15	+13	+14	+5																			
6190, 416 ..	-9.0	-18	-15	-7	-10	0	+3	+7	+7	+10	+12	+5																			
6676, 86 ..	-1.6	-22	-12	-2	-1	+2	0																								
7646, 65 ..	-4.9	+20	+30	+20	+31	+33	+31	+30	+28	+29	+32	+26																			
7774, 88 ..	+14.7	+3	+21	+24	+21	+18	+14	+6	+6	+2																					
6937, 42 ..	-1.8	-76	-60	-41	-19	-5	+12	+26	+27																						
7266, 82 ..	+21.7	-17	+1	+7	+15	+20																									
7737, 51 ..	+12.8	-13	+8	+34																											
7772, 96 ..	+8.8	-46	-19	-1	+2	+3	-1	-1																							
7805, 918 ..	-21.8	-26	-24	-22																											
7809, 920 ..	+7.8	-40	-22	-7																											
7977, 8008	-14.8	-33	+1	+16	+19	+17	+18	-1	-9	-5	-7																				
8047, 73 ..	+18.4	+13	+14	+12	+11	+8	0	-1																							
8256, 89 ..	-12.8	-45	-20	-20	-8	-1	+2	+4	+8	+10	+13	+12																			
8317, 48 ..	+7.7	-21	-6	+1	+6	+13	+10																								
8328, 70 ..	-13.6	-21	-17	-15	-18	-18	-16	-19	-17																						
8369, 402 ..	+16.3	+4	+11	+3	+11	+14	+15	+10																							
8661, 717 ..	+10.8	-35	-20	-10																											
8922, 52 ..	+4.6	-36	-23	-18																											
9007, 30 ..	-2.1	-54	-34	-16	-8	-6	-8	-11	-6	-3	+3	+4																			
9064, 75 ..	-15.0	+1	+13	+16	+19	+21	+17	+18	+16	+13																					
9258, 70 ..	-9.2	-37	-25	-21	-18	-15	-12	-11	-6	-1	+1	+5																			
9284, 94 ..	-15.1	-28	-10	-8	-9	-5																									
9384, 88 ..	+10.5	-22	+5																												
9396, 99 ..	+7.7	+2	+2	+17																											
9397, 400 ..	+3.9	+24	+25	+26	+22	+19	+14	+10	+10	+5	+1	-8																			
9426, 39 ..	-7.8	-23	-17	-16	-12	-8	-15																								
9465, 69 ..	-11.8	+10	+9	+8	+4																										
9511, 14 ..	-16.9	-7	-6	-7	+4	+11	+13	+5	+7	+4	+2	+2																			

not available are indicated by ..

(19318)

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TABLE III.

(c) 60-Day "Leader" Spots.

Displacement of Spots in longitude (unit= 0.1°)

Group Numbers.	Latitude	1	2	3	4	5	6	7	8	9	21	22	23	24	25	26	27	28
436, 53, 71	14.9	-53	-30	-15	-7	+6	+13	+20	+17	+23							+1	+4
1828, 35, 52	9.3	+7	+19	+23	+20	+16	..	-2						+6	+8	+6	+10	+11
1878, 84, 97	11.2	+1	+18	+25	+27	+18						+18	+12	+10	+8	+10	+7	+9
1891, 1901, 10	14.3	+4	+27	+42	+43	+40	+40	+38	+36						+10	+10	+10	+1
2560, 83, 2615	31.0	-6	+1	+16	+20	+12	+20	+24	+23	+23						+15	+13	-4
3371, 3402, 43	16.6	-22	-11	-4	+1	-6						+4	-1	+1	+1	+1	+7	+10
4234, 56, 78	13.7	+3	+9	+21	+26						+4	+14	+11	+13	+14	+15	+10	+12
4416, 35, 46	11.1	-35	-24	-16	-15	-11	-12	-11	-15	-11				+12	+8	+5	+6	+8
4505, 26, 41	6.1	-57	-48	-36	-18	-12					+7	+9	+4	+3	+4	+5	+8	+12
4517, 32, 49	1.4	-64	-54	-35	-25	..	-20	-14	-14				+5	0	+3	+2	+3	+4
5597, 5622, 53	13.9	-1	+2	+6	+6						-14	-7	-5	-6	-4	-4	-4	-2
5785, 5802, 20*	10.9	-37	-24	-16	+1	+4	+9	+5	+2	-9					+17	+15	+11	+10
6393, 6420, 40	15.0	-32	+2	+13	+17	+19	+22	+26	+25	+26						+25	+18	+19
6494, 6517, 35	6.4	-21	-9	-10	+2	+4	+2	+5	+3	+2				+15	+13	+13	+10	+11
6499, 6519, 39	5.4	+1	+7	+21	+10	+17	+4				+29	+33	+31	+28	+28	+26	+24	+23
6589, 6602, 18	3.0	-17	-3	+1	+2	-4					-4	-5	-2	-4	-1	-1	0	0
6722, 33, 54	12.9	-82	-75	-57	-49	-54	-49	-43	-38	-27					+27	+28	+33	+34
6723, 34, 53	1.3	+2	+11	+25	+22						+13	+9	+12	+13	+12	+12	+12	+11
7304, 41, 84	17.6	-59	-49	-45	-38	-32					+9	+10	+10	+9	+9	+10	+8	+7
7564, 95, 622	10.5	+4	+16	+24	+23	+22					+23	+19	+21	+20	+20	+16	+13	+8
7746, 69, 89	12.6	-15	-5	..	+6	+14					+25	+25	+25	+23	+20	+18	+18	+16
7833, 53, 76	25.0	-86	-76	-62	-54	-54					+16	+13	+9	+10	+10	+5	+1	-4
8089, 8125, 63	23.9	+2	+14	+19	+18	+16	+13	+8	+10	+12								
8337, 66, 8401	6.5	-42	-36	-18	-3						+11	+5	+6	+3	+4	0	+3	+3
8612, 51, 80	16.1	-47	-40	-19	-3	+12	+20	+22	+26	+26						+20	+17	+13
8738, 66, 61	10.0	-32	-17	-8	-11	-15					+14	+13	+11	+6	+10	+7	+7	+6
8815, 34, 58	6.0	-92	-58	-39	-28	-20					+17	+22	+19	+14	+18	+17	+18	+17
8948, 73, 9002	13.8	+6	+12	+15	+10	+6	+2				+14	+15	+12	+11	+6	+7	+11	+11
8966, 94, 9021	6.4	-82	-51	-29	-18	-9	-4	+1	-1					+16	+18	+16	+14	+13
9143, 57, 74	5.8	-2	+11	+10	+7	+6	+2	+4	-2					+8	+4	+10	+8	+4
9334, 45, 60	0.9	-27	-27	-26	-27	-29	-24	-18	-21					+8	+14	+14	+14	+12

TABLE III.

(c) 60-Day "Leader" Spots.

on day of formation (day 1) and successive days.

29	30	31	32	33	34	35	48	49	50	51	52	53	54	55	56	57	58	59	60	61
+ 4	+ 8	+ 6	+ 2	+ 2	+ 6	+ 6							-12	-10	- 7	-10	- 8			
+15	+12	+14	+16	+ 7	+13					-22	-16	-15	-16	-15	-16	-17	-18	-19	- 22	-25
+ 8	+ 8	+ 7	+ 8					-16	-12	-14	-10	-15	-13	-17	-20	-21	-24	-26		
+ 1	0	- 3	- 9	- 7	- 9	- 9						-26	-31	-29	-25	-23	-20	-22	-21	-23
+ 5	+ 7	+ 4	+ 6	+10	+ 8	+10							+ 1	- 8	-16	-20	-19	-18	-13	-20
+ 6	+ 7	+ 6	+ 4	+13				+ 4	+ 2	- 2	- 8	- 8	- 7	- 8	-11	- 3	+ 2	+ 3		
+ 9	+10	+13	+13				-20	-23	-18	-20	-19	-18	-15	-14	-13	- 9	-13	- 9		
+ 7	+ 9	+11	+ 9	+10	+ 8	+ 5					+ 6	+ 6	+ 1	+ 6	+10	+13				
+12	+13	+15	+10				+ 6	+ 9	+11	+ 9	+10	+ 6	+ 3	0	+ 2	+ 2	+ 5			
+ 3	+ 3	+ 6	+11	+ 7	+13				+ 4	+ 6	+ 8	+ 8	+12	+16	+17	+17	+21	+26	+29	
- 1	- 2	- 4	- 3				0	+ 1	+ 2	+ 5	+ 3	+ 8	+ 5	+ 9						
+ 9	+ 4	0	+ 1	- 1	+ 3	+ 4						- 9	- 5							
+15	+14	+17	+16	+13	+11	+10							-21	-23	-24	-27	-24	-27	-30	-34
+ 8	+ 7	+ 6	+ 6	+ 3	+ 2	- 1					-12	- 8	-12	- 9	- 8	-11	-11	-14		
+21	+15	+16	+20				-27	-32	-33	-30	-31	-34	-32	-34	-29	-26	-26	-24		
+ 3	+ 3						+ 8	0	0	+ 3	- 1	0	+ 4	+ 4						
+33	+31	+32	+31	+34	+33	+36				+15	+ 9	+10	+ 9	+ 8	+ 7	+ 7	+ 6	+ 6	+ 6	
+13	+ 7	+ 5	+ 8				- 8	-16	-17	-13	-13	-12	-12	-15	-17	-13	-19	-24		
+ 7	+15						+19	+19	+19	+15	+11	+ 9	+ 7	+ 2	+ 2	+ 2	0			
+ 4	0	+ 2	+ 3						-13	-15	-14	-16	-19	-21	-25	-28	-30	-36	-35	
+16	+14	+14	+12				- 8	-10	-15	-16	-17	-14	-13	-10	- 8	- 4	- 1			
- 9	-21	-19	-15	-25			+10	+14	+18	+23	+30	+34	+35	+33	+39	+35	+40	+36		
- 5	- 6	-11	- 9	- 6	- 5	- 3									- 6	- 6	- 6	- 6	- 3	
+ 2	+ 6	+ 2					+12	+ 8	+15	+ 4	+ 2	+ 3	+ 1	- 1	- 1	+ 2	+ 4			
+15	+12	+ 9	+12	+11	+ 9	+ 4					-13	-10	-11	-16	-11	-11	+14	+10	+12	
+ 5	+ 4	+ 5	+11				+ 8	+11	+ 7	+ 2	+ 1	- 2	- 6	- 8	-11	-12				
+16	+22	+20	+21				+ 8	+14	+ 4	+ 4	+ 2	+ 2	0	0	0	0	0	- 4		
0	-10	-15	- 3				+ 5	0	+ 2	- 4	- 7	- 9	-12	-15	-16	-17	-21	-22		
+10	+10	+ 9	+ 7	+ 7	+ 8	+ 8				+23	+19	+16	+16	+11	+11	- 1	-15	+ 8	-18	
+ 5	+ 2	- 2	- 4	- 6	- 5	- 2				+ 4	+ 2	+ 2	+ 1	- 5	-14	-24	-24			
+13	+10	+10	+ 8	+ 8	+12	+ 7				+ 3	+ 9	+ 8	+ 6	+ 5	+ 5	+ 7	+ 9	+ 6	+ 6	+ 7

TABLE IV.

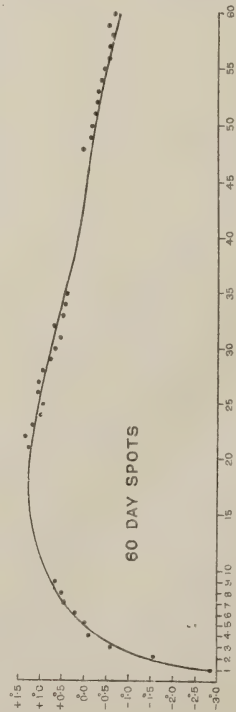
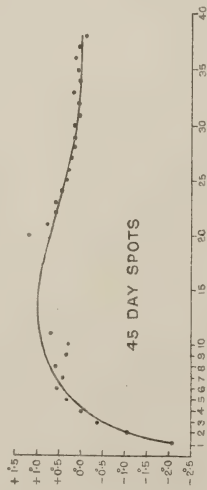
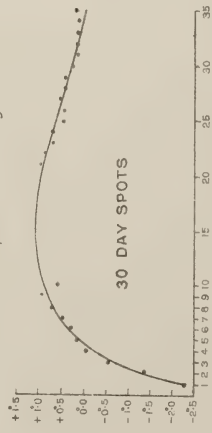
Mean Displacements in Longitude and Areas of "Leader" Spots.

(a) 30-day "Leader" Spots.				(b) 45-day "Leader" Spots.				(c) 60-day "Leader" Spots.			
Day.	Displacement.	Area.	Number of Spots.	Day.	Displacement.	Area.	Number of Spots.	Day.	Displacement.	Area.	Number of Spots.
1	0			1	0			1	0		
2	-2.30	106	59	2	-2.18	128	58	2	-2.84	119	30
3	-1.36	167	60	3	-1.03	242	58	3	-1.57	230	30
4	-0.60	219	60	4	-0.39	306	58	4	-0.58	308	30
5	-0.04	243	56	5	0.00	340	49	5	-0.11	345	30
6	+0.19	268	49	6	+0.32	373	47	6	-0.01	385	26
7	+0.27	285	43	7	+0.54	409	41	7	+0.23	415	16
8	+0.46	301	38	8	+0.42	436	34	8	+0.43	428	15
9	+0.71	283	29	9	+0.58	450	28	9	+0.51	485	14
10	+0.94	297	23	10	+0.33	458	23				
	+0.58	280	14	11	+0.28	452	18				
					+0.71	394	14				
				20	+1.22	239	13				
21	+0.95	189	16	21	+0.79	281	20	21	+1.28	356	14
22	+0.86	163	22	22	+0.60	290	23	22	+1.34	367	16
23	+0.71	154	27	23	+0.63	271	28	23	+1.19	349	17
24	+0.72	142	34	24	+0.46	247	34	24	+1.01	351	23
25	+0.48	131	42	25	+0.37	263	39	25	+0.94	342	26
26	+0.47	119	50	26	+0.28	253	42	26	+1.05	337	29
27	+0.51	104	54	27	+0.23	246	51	27	+1.04	328	30
28	+0.42	99	54	28	+0.18	238	58	28	+0.93	316	30
29	+0.41	88	51	29	+0.18	231	58	29	+0.81	303	30
30	+0.27	79	45	30	+0.18	216	58	30	+0.69	296	30
31	+0.19	72	43	31	+0.09	208	54	31	+0.56	296	29
32	+0.19	56	33	32	+0.09	165	46	32	+0.65	278	28
33	+0.19	41	26	33	+0.23	177	40	33	+0.49	276	17
34	+0.13	11	21	34	+0.03	157	36	34	+0.48	259	15
35	+0.22	17	12	35	+0.10	144	30	35	+0.43	267	13
				36	+0.16	131	24				
				37	+0.06	99	20				
				38	-0.10	107	15				
								48	+0.08	175	10
								49	-0.11	158	15
								50	-0.17	144	17
								51	-0.24	134	22
								52	-0.29	130	24
								53	-0.30	118	27
								54	-0.38	112	30
								55	-0.46	111	29
								56	-0.56	89	27
								57	-0.56	81	28
								58	-0.63	85	26
								59	-0.55	57	21
								60	-0.66	43	13
								61	-0.98	11	7

"LEADER" SPOTS (30, 45, AND 60 DAYS AVERAGE DURATION) MEAN DISPLACEMENTS IN LONGITUDE AND AREAS.

MEAN DISPLACEMENTS IN LONGITUDE.

Abscissae - Days from formation of Spots.
Ordinates - Displacements in longitude.



MEAN AREAS.

Abscissae - Days from formation of Spots.
Ordinates - Areas, corrected for foreshortening in millionths of Sun's visible hemisphere.

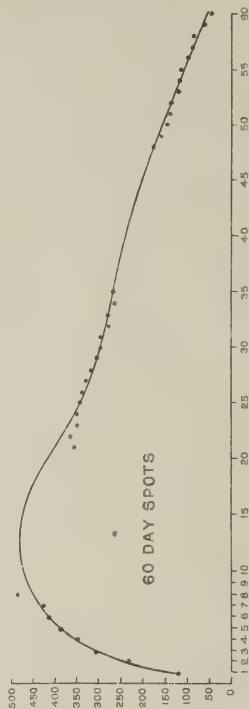
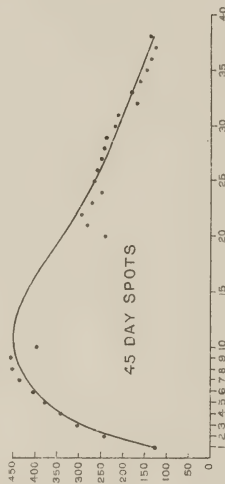
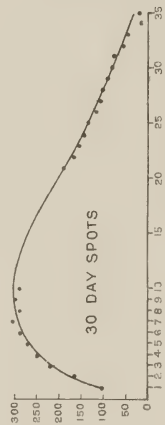


Table IV gives the mean displacements derived from the preceding tables. The means of those days on which the greatest number of spots were together visible were used as fiducial points from which mean positions for other days were derived. For example: in Table III, Class (c), 30 spots were seen on days 1, 2, 3, 4; 27, 28, 29, 30; 54. The means of these 30 spots were taken, and gave the relative positions as tabulated in Table IV. But on the 8th day only 14 spots were seen. The difference between the mean position of these 14 spots and the same 14 on the 4th day was $+0^{\circ} \cdot 62$; this was applied to $-0^{\circ} \cdot 11$ of 4th day and gave $+0^{\circ} \cdot 51$ for the 8th day. Similarly, for the 21st day, 14 spots were seen which occur on the 29th day, the difference of the mean position being $+0^{\circ} \cdot 47$. Applying this to the value $+0^{\circ} \cdot 81$ already found, $+1^{\circ} \cdot 28$ was obtained, as the mean displacement for the 21st day. Actually, values found in this more accurate but slightly complicated manner differ very little from those obtained by taking the simple means of the columns in Tables I, II and III.

The corresponding mean areas, corrected for foreshortening and expressed in millionths of the Sun's visible hemisphere, are also given in the tables for comparison with the displacements in longitude, but it was thought unnecessary to give the separate observations.

The average diurnal movement of the spots in longitude is derived from the curves as follows:—

TABLE V.
Diurnal Movement in Longitude of "Leader Spots."

Day.	(a) 30-day Spots.	(b) 45-day Spots.	(c) 60-day Spots.
1—3	$+0^{\circ} \cdot 85$	$+0^{\circ} \cdot 85$	$+1^{\circ} \cdot 10$
3—5	$+0^{\circ} \cdot 40$	$+0^{\circ} \cdot 30$	$+0^{\circ} \cdot 35$
5—7	$+0^{\circ} \cdot 20$	$+0^{\circ} \cdot 20$	$+0^{\circ} \cdot 20$
7—9	$+0^{\circ} \cdot 15$	$+0^{\circ} \cdot 10$	$+0^{\circ} \cdot 15$
9—21	$0^{\circ} \cdot 00$	$0^{\circ} \cdot 00$	$+0^{\circ} \cdot 04$
21—36	$-0^{\circ} \cdot 06$	$-0^{\circ} \cdot 04$	$-0^{\circ} \cdot 05$
48—61	..	..	$-0^{\circ} \cdot 05$

Thus in the first two days of its life the leader spot of a group appears to be moving rapidly forward in longitude at the rate of about $1^{\circ} \cdot 0$ per day. In the next two days the rate has diminished to about $0^{\circ} \cdot 4$ per day, and it continues to diminish until about the 15th day, when the spot is moving with the mean velocity corresponding to its latitude. By about the 20th day it is moving slowly backwards at a rate of about $0^{\circ} \cdot 05$ per day. Corresponding changes take place in the size of the spots, which increase rapidly at the start, reach a maximum at about the 10th day, and then slowly decline. It may be noticed that the area is a maximum at nearly the same time both for spots which last 60 days, and for those of half that duration.

A summary of these results is also given in *M.N.R.A.S.*, April, 1925, pp. 553–560.

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